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Evaluation of the State Implementation Plan Revision Submitted by New York State in Fulfillment of the Moynihan-Holzman Amendment

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THIS DOCUMENT, "EVALUATION OF THE STATE IMPLEMENTATION PLAN REVISION SUBMITTED BY NEW YORK IN FULFILLMENT OF THE MOYNIHAN-HOLTZMAN AMENDMENT" WAS PREPARED TO ASSIST THE U.S. ENVIRONMENTAL PROTECTION AGENCY IN ITS REVIEW OF A NEW YORK STATE IMPLEMENTATION PLAN REVISION. IT DOES NOT NECESSARILY REFLECT THE VIEWS OF THE ENVIRONMENTAL PROTECTION AGENCY NOR CAN THE AGENCY VOUCH FOR ITS ACCURACY.

EVALUATION OF THE STATE IMPLEMENTATION PLAN REVISION SUBMITTED BY NEW YORK STATE IN FULFILLMENT OF THE MOYNIHAN-HOLTZMAN AMENDMENT

September 1979

FINAL REPORT

Project Officer: Mr. John Walsh
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16. ABSTRACT

The objective of this study is to assist the U.S. Environmental Protection Agency in reviewing and evaluating the Submission by the State of New York in response to the Moynihan-Holtzman Amendment of the 1977 Clean Air Act. The Moynihan-Holtzman Amendment specifies that any alternative to bridge tolls in the State Implementation Plan must include comprehensive plans to "establish, expand, or improve public transportation measures to meet basic transportation needs as expeditiously as practicable".

The submission is critically examined from various viewpoints - philosophical, technical, and sociological. A frame of reference for the evaluation was constructed based on four pertinent areas: industry-wide transit performance measures and standards, local public perceptions and priorities, local transit operator and planning agencies' projects and budgets, and comparable metropolitan transit system performance and budget data.

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EXECUTIVE SUMMARY

The Moynihan-Holtzman Amendment of the 1977 Clean Air Act charges the State of New York with the responsibility to develop and implement a transit improvement program to meet the "basic transportation needs" of the New York City metropolitan area.

This study is a critical evaluation of the New York State Submission in response to the Moynihan-Holtzman Amendment. The submission is evaluated from various viewpoints - philosophical, technical, and sociological. The study team was composed of Dr. Alain L. Kornhauser (Civil/Mechanical Engineer), Dr. Jerome M. Lutin (Urban Planner), Dr. Reggie J. Caudill (Mechanical Engineer), Dr. Michael J. Munson (Urban Planner), Dr. James Beniger (Sociologist), and Mr. Rasin Mufti (Civil Engineer). Dr. Jerome M. Lutin was Project Director.

Five basic tasks form the primary structure of this evaluation: (1) an examination of industry-wide transit performance measures and standards to provide a frame of reference for the evaluation of the New York metropolitan area system; (2) a determination of transit needs based on local perceptions and priorities; (3) an analysis of the budget and cost data in the New York region; (4) a comparative analysis of transportation service and expenditures for other areas with similar levels of transit service; (5) an analysis of the submission itself to provide a framework for the evaluation.

A set of itemized conclusions resulting from this evaluation procedure is presented in Chapter VI of this report. In summary, the key conclusions of this study are as follows:

- The submission does not adequately define basic transportation needs, nor does it advance a program of sufficient scope and financial resources to satisfy the likely mobility needs of individuals in the region.

- "Basic transportation needs" should refer to the mobility of people, not the movement of vehicles; consequently, the performance measures and standards should be user-oriented rather than system-oriented.
- The proposed budget is insufficient to provide for the transit improvements specified in the submission. Given the modest estimates for future inflation and unemployment rates, the deficit could exceed $350 million.
- The projection of operating assistance funds past 1982 is developed by a methodology which may result in an over-estimation of available funds.
- Public opinion surveys indicate that transit ridership is more sensitive to the quality of service and safety than to cost; transit improvements are needed, and the public is willing to pay increased fares or taxes to fund the improvements.
- The issue of transportation needs of special groups, including the poor, elderly, and handicapped is not appropriately addressed by the submission, no funds are budgeted, and no alternative funding source is identified.
- Transit riders express considerable apprehension about personal security when riding transit, especially subways. Concern for safety outranks all other travel attributes, including cost, in ridership surveys.

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I. EVALUATION STRUCTURE AND METHODOLOGY

The purpose of this study is to assist the U.S. Environmental Protection Agency in reviewing and evaluating the revision to the State Implementation Plan as required by the Moynihan-Holtzman Amendment to the Clean Air Act, August 1977. The Moynihan-Holtzman amendment was designed to eliminate the requirement for bridge tolls on the East River bridges leading into Manhattan from the boroughs of Queens and Brooklyn. It was believed by local officials that the imposition of such tolls, which had been required by the transportation control plan to reduce auto emissions, would result in serious economic difficulties for the city of New York. However, in order to insure that adequate substitute provisions would be made to insure reductions in motor vehicle travel and commensurate improvements in air quality, the Moynihan-Holtzman Amendment required that the State Implementation Plan be revised to include comprehensive measures to meet basic transportation needs. In response to this provision the state of New York prepared a revision to the State Implementation Plan. It is this revision to the State Implementation Plan, known as the Moynihan-Holtzman Submission, which is the subject of this study.

This investigation has been restricted to Title 1, Part A, Section 110 (c)(5)(b)(i) which states,

> "The [State Implementation Plan]...shall...be revised to include comprehensive measures...to (i) establish, expand or improve public transportation measures to meet basic transportation needs, as expeditiously as is practicable,... and such a plan shall, for the purpose of implementing such comprehensive public transportation measures, include requirements to use Federal grants, State or local funds or any combination of such grants and funds..."

This study does not examine provisions of the New York Submission relevant to Subparagraph (ii) which would require examination of air quality improvements which will result from basic transportation improvements.

Transportation needs differ markedly from the five counties of New York City to the surrounding less-dense suburban counties. Commuter rail and suburban bus service needs are de-emphasized in the submission, with the major emphasis being placed on urban bus and subway improvements. The lack of a discussion of the differences in basic needs and performance criteria for central city and suburban public transportation is considered to be a deficiency in the submission.

One of the implications of the Moynihan-Holtzman Amendment, which was not specifically addressed in the submission, was the achievement of mass transit benefits equivalent to those expected from the bridge toll strategy (letter from Costle to Carey, June 20, 1978). Toll revenues would have provided additional financial assistance to New York's mass transit system, beyond that obtainable through Federal programs. This issue was not dealt with in the submission.

Study Methodology

Objectives and Approach

In order to insure a fair and objective analysis of the Submission, two basic objectives were proposed. The first was to interpret the Moynihan-Holtzman Submission from the point of view of planners and transit analysts. The study team did not look at it as lawyers or administrators and acknowledges that certain legal aspects of the plan are more appropriately addressed by the EPA and its attorneys.

Second, the review process has tried to maximize the independence of the individuals involved in the review. External facts and data have been examined independent of the submission, with respect to the transportation industry, federal and local government policy, operating agencies, and transit properties. An independent examination was conducted of the text itself, and a consensus was reached based on the opinions of all individuals in the study team.

A multidisciplinary approach was adopted. The study team was composed of Dr. Beniger, a sociologist; Dr. Caudill, mechanical engineer; Dr. Kornhauser, a mechanical and civil engineer; Dr. Lutin, an urban planner; Mr. Mufti, a civil engineer and Dr. Munson, an urban planner. An unbiased report seemed most likely to result from assigning to each member of the study tasks in specific functional areas which could be pursued independently of the other team members. Each individual would then be free to develop an independent assessment of the adequacy of the items relevant to his specific area, without being influenced by opinions of other analysts on the team. Until the concluding dialog session (described below), communication among study team members was kept to the minimum needed to insure consistency of the final report.

The Task Structure

Five basic tasks provided the framework for the structure of the study. The first task, to examine transit performance measures and standards industry-wide, required investigation of what is considered to be good operating practice, desirable standards, and minimum acceptable standards for the public transit industry as a whole. Data for transit properties all over the nation were obtained to provide a frame of reference for the evaluation of the New York system.

The objective of Task 1 was to establish a basic set of performance criteria against which to measure the improvements to the New York metropolitan transit system stated in the submission. Other transit systems, industry groups and federal agencies were contacted to determine relevant standards which had been promulgated and accepted. A major concern was the distinction between "basic" transportation performance levels and "desirable" levels.

The second task was the determination of basic transportation needs based on examination of local perceptions and priorities. Regardless of standards in other metropolitan areas, the New York metropolitan area has a unique relationship with public transit. According to the 1970 Census Journey to Work data, of all U.S. residents commuting to work by rail in 1970, 81% lived in the New York Standard Metropolitan Statistical Area (SMSA). Because such a large percentage of New York residents (43%) commute to work by transit (versus less than 9% for the rest of the country), the New York region is often considered an anomaly with respect to transit usage.

In order to ascertain local perception of "basic transportation needs", for task number two, three types of data were obtained. First, results of recent behavioral and public opinion surveys of New York residents concerning transportation behavior and attitudes were obtained and examined. Second, local planning agencies, transit operating agencies, and legislative staffs were contacted to obtain documents which outlined governmental perceptions of local transportation needs and priorities. Third, various public interest groups and citizen's organizations were contacted to determine which transportation needs were common concerns among groups of individuals within the region.

Task number three involved obtaining budget and cost data for transit operations in the New York region. Planning agencies and transit operating agencies were contacted to obtain copies of documents dealing with the financial aspects of public transportation operations in New York. The objective of this task was to obtain independent estimates of historic trends and future projections for transit expenditures. These data would provide a reference to determine whether expenditures in the SIP revision were consistent with respect to other estimates of capital and operating needs, and were in line with historic trends in revenue, inflation, and operating cost.

Task number four required collection of data on transportation service and expenditures for other urban areas with similar levels of transit service. While New York's transit system is much larger than other systems, an attempt was made to compare systems on a unit cost basis, to determine if New York's costs, subsidies, and revenues were comparable to those in other areas. Coupled with data from task three, this information would permit an assessment of the financial commitment to transit in the New York region as compared with other regions, to determine the relative pattern of federal transit subsidies.

The fifth task of the study required an analysis of the submission itself, to provide a framework for evaluation. Key phrases and terms were extracted and analyzed to determine if they were used consistently within the submission, and were consistent with provisions of the Clean Air Act (CAA). Semantics were considered important because of the vagueness of the wording in the CAA. The overall structure of this study was determined by the need to scrutinize the submission on a point-by-point basis.

The completion of these separate tasks required holding a one-day conference/dialog session, in which all issues related to the submission were discussed and compared with independently derived standards. This dialog session formed the basis for this report.

Data Analysis

Neither the time nor the funding available to this project permitted the conduct of any new survey research; nor did they permit reanalysis of any primary survey data in the form of computer tapes, cards, etc. All of the data presented here have been collected by others and are in their original form (univariate distributions, cross-tabulations, etc.) as presented in published form or private typed documents. The contributions of this analysis include a census of all available transportation surveys conducted in the New York City area in recent years, the indexing of all individual questions and items on these surveys, and the retrieval, comparison and integration of these various findings in a unified review of transportation needs (Section II.C), priorities (Section III.C), and evaluations (Section IV.B.3).

Structure of the Report

The report is structured in six chapters. Chapter I discusses the evaluation structure and methodology. Chapter II evaluates alternative definitions of basic transportation needs, with particular emphasis on the definitions used in the Moynihan-Holtzman Submission. Chapter III discusses performance standards and criteria for transit systems required to meet basic transportation needs, including industry standards, local priorities, and standards derived from federal policy. Chapter IV includes an evaluation of the public transportation actions proposed in the Moynihan-Holtzman Submission to determine whether they, in fact, meet basic transportation needs and are consistent with the performance criteria stated. Chapter V examines proposed levels and availability of funding to determine the likelihood of implementation of the proposed actions in the immediate future. Chapter VI contains the conclusions drawn from the study as a whole, with adequacy of the Submission considered not necessarily with respect to compliance with the law, but in terms of definitions of basic transportation needs, performance criteria, actions taken, and funding and implementation likelihood, with respect to other regions and industry-wide practice.

The report also contains four appendices:

Appendix A is an analysis of operating budgets proposed in the Moynihan-Holtzman Submission. Appendix B contains supporting exhibits for Section II.C, Basic Transportation Needs in the New York Context. Appendix C contains supporting exhibits for Section III.C, Local User Priorities in Performance Evaluation. Appendix D contains supporting exhibits for Section IV.B.4, Local Views of Moynihan-Holtzman Submission Actions.

II. EVALUATION OF ALTERNATIVE DEFINITIONS OF BASIC TRANSPORTATION NEEDS (BTN)

II.A. Alternative Definitions Based on Point-of-View

The definition of the term "basic transportation needs" varies with the point of view of the definer. For the purposes of this study, five viewpoints are relevant: those of

(1) the individual user of transportation,
(2) the planner,
(3) the operator of public transportation,
(4) agencies involved in funding transportation improvements,
(5) the U.S. Environmental Protection Agency (EPA)

These viewpoints are applicable to public rather than private transportation measures. Consideration of private measures would have involved other points of view.

User's Definition

The user defines basic transportation needs in terms of his own mobility, most fundamentally requiring that the transportation system be capable of taking him where he wants to go. The user also requires that the system meet certain criteria with regard to his own safety, convenience, and comfort.

Personal safety and security is a primary consideration for the user: he wants to be able to make a journey with the reasonable expectation of arriving unmolested and intact at the end of the journey. A user also expects the system to accommodate the physical limitations of individuals. This requires not only recognition of normal parameters of human tolerance for conditions such as acceleration forces, temperatures, and physical space, but also necessitates consideration of the special needs of the elderly and handicapped.

A certain level of convenience is also expected by a user: the system should be able to bring him close to his destination, and to do so within reasonable time and cost limitations. Regular and reliable service must be maintained, so that users can depend on transportation being available on a regular and continuing basis appropriate for the time of day, as they plan their daily activities.

A reasonable level of comfort, as distinguished from conditions needed merely to maintain human survival, is also included in the user's definition of basic transportation needs. For comfort a user wants a clean and quiet environment, a seat, protection from weather, maintenance of reasonable levels of temperature and humidity, and freedom from crowding.

And, since even a transit user is a non-user some of the time, he cannot completely ignore the transportation system's effects on a non-user. Thus he would expect the transportation system not to be offensive to the non-user; it should not intrude unduly on the environment or provide offensive noise, dust, or interruption to someone who does not use the system.

Planner's Definition

The planner's definition of basic transportation needs will differ from that of the user since the planner must concern himself with system-wide and region-wide goals and objectives. He would define basic transportation as that level of transportation service required to permit safe and efficient functioning of the region. The planner is concerned with such issues as equity of service; he must determine how all groups in the community can be served equitably. The planner is interested in satisfying aggregate demand rather than individual demand. In addition, he is concerned with maintaining the economic, social, and cultural life of the community, and with realizing regional goals; the planner sees basic transportation needs in the context of all the elements necessary to enable the region to function in a manner which maximizes the quality of life for all residents.

Operator's Definition

The operator's definition of basic needs is more specific than the planner's. The transit operator would define basic transportation needs as the physical resources needed to maintain and operate a system or provide a specific service. His definition of need is nearly always expressed in dollars or cash. Frequently, his needs are quite specific and easily expressed as a line-item budget.

Funding Source Definition

An agency involved in funding transportation would define basic transportation needs in terms of the fiscal resources needed to maintain operations and improve and extend the system or service. Such a definition is similar to the operator's but it has certain conditions placed upon it. First, if the agency is not exclusively concerned with transportation, the definition is influenced by competing needs. There are funding needs in areas other than transportation which must be satisfied. The funding source must look at transportation and competing needs and make a balanced allocation. Second, he must consider transportation needs in light of limited available resources; there is a limited amount of money available in the public purse to provide for all needs of the community. Third, there is competition among regions for transportation funding. Those responsible for funding transportation must allow some discretion and local control over the use of allocated funds; they must also strive to achieve equity among the competing regions. Such equity may not necessarily be defined in terms of absolute standards, which would imply that regions with the poorest public transit would receive all the funding; rather, equity may be defined as allocating funds to achieve uniform improvements.

Basic Needs Definition Implied by the Clean Air Act

The Moynihan-Holtzman Amendment to the Clean Air Act permits a trade-off among various transportation control measures. When the bridge toll requirement was removed, the Amendment called for other actions to achieve equivalent results. Thus, the concept of basic transportation needs might well be interpreted as 'those actions required to make public transportation attractive enough to induce auto drivers in sufficient numbers to take public transit, so as to achieve results equivalent to the imposition of bridge tolls.' This definition, while clearly in accord with the spirit of the Clean Air Act, was de-emphasized by the drafters of the submission on the grounds that bridge tolls would not significantly reduce emissions and public transit improvements would have a limited impact on reducing auto use.

The EPA definition of basic transportation needs includes those actions required to provide sufficient mass transit service and capacity to permit institution of any necessary auto restraint strategies within the air quality non-attainment area. If strategies to reduce auto travel were implemented to attain air quality standards, current mass transit service would prove inadequate to handle large shifts of travelers from auto to mass transit. Thus, basic transportation needs would be defined in terms of substituting transit for auto to maintain individual mobility and attain air quality standards (letter from Costle, 1978).

II.B. Basic Transportation Needs (BTN) in the National Context

In addition to being affected by the perspective of the definer, the definition of basic transportation needs can be influenced by factors such as the time period, location, or political climate. What constitutes a basic transportation need at any one time or for a particular community and geographic setting might not be adequate at another time or in a different community and geographic setting.

A changing political climate can cause similar differences in definition. In a conservative climate, BTN may be viewed as an individual matter related to what any particular person is willing to pay. In a liberal political climate, on the other hand, BTN may be compared to the need for decent housing or the right to work. In fact, the latter might have a strong cause and effect relationship with BTN.

The relatively subjective manner in which needs can be defined suggests the close association of these definitions with a stated goal or objective. The definition itself can be a statement of objectives, or it can be an action or a set of actions required to satisfy certain goals and objectives.

The Federal Definition of BTN

On the federal level, the absence of a clear definition of basic transportation needs severely hinders formulation of national transportation policies in general and urban transportation policies in particular.

Only in recent years, and only under a great deal of pressure from special interest groups or other government agencies, have national transportation policies begun to emerge. Government policies, though they attempt to recognize users', planners', and operators' points of view, are often confused and conflicting. Two agencies of the Federal government, both dealing with transportation, may propose policies and definitions which may be in conflict, if, for example, one is concerned with mobility and the other with conservation.

The first attempt by the U.S. Department of Transportation to define transportation needs was the 1972 National Transportation Needs Study carried out by local and state agencies. The scope of the study was not limited to basic needs and the study produced what was, in effect, a 'wish list' of all transportation needs.

In addition to the problems caused by a late start in considering transit needs and conflicting purposes within government agencies, the Federal government's attempts at reaching a uniform national definition of basic transportation needs have been hampered by an emphasis in Federal policies on permitting local governments to define their own basic needs. Recently, however, those policies have been confronted by national concerns of increasing urgency. Among such concerns are the needs of the elderly and handicapped; the need to improve and protect the environment, to save energy, and to improve system efficiency (do more with less). This last area of concern has manifested itself primarily in the shift in concentration from long-range planning to short-range planning, from high capital into low capital intensive investments.

Thus attempts to define basic transportation needs on a national level and to formulate national transportation policies have been hindered by considerations not traditionally associated with transportation needs: there is a need to provide transportation for the elderly and handicapped; there is a need to have the transportation sector contribute to cleaning up the environment; there is a need to have the transportation sector conserve resources. Do any of these, if not all of them, fall into the category of basic needs? Such considerations are likely to have contributed to the absence of clear federal policy on BTN.

Impact of Federal Policies on the Operator's Definition of BTN

The operator's definition of BTN in the national context, as discussed earlier, has focused on the physical resources needed to maintain and operate a system or provide a specific transportation service. More recently, however, the same national concerns which have influenced Federal policies are having a marked impact on the operator's concept of basic transportation needs. In order to continue their eligibility for federal aid, the operators, nationwide, are modifying

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their plans and programs in response to federal policies and regulations addressing new issues of national needs.

Local Definition of BTN

The national concerns influencing the Federal government are also producing a reaction from local governments. Sometimes the reaction is voluntary; sometimes it is a response to the Federal "carrot and stick" approach. Certain state or local governmental agencies have declared their own policies and objectives with respect to some of the issues of concern and have actually redefined their transportation needs to reflect and respond to these concerns. In the well known Federal "carrot and stick" approach, federal funds and financial assistance are made available to local governments contingent on the adoption of certain policies or programs. Thus local priorities and definitions of local transportation needs are being modified to reflect Federal concerns and priorities. Local programs are beginning to reflect interest in conservation (low capital intensive projects), energy, air quality improvements, as well as in the more traditional transportation concerns such as improved safety, efficiency, and reliability. These areas of improvement reflected in local programs are also, not surprisingly, seen in the goals and objectives of many metropolitan areas today, particularly in dealing with the transportation system management element of the regional transportation plan.

In summary, there is no national consensus on the definition of basic transportation needs, and any one definition may be a function of time, place and political climate. The absence of a clear federal definition stems also from the opposing influences of a desire to allow local governments to determine their own needs and the presence of new issues requiring attention on a national level. Local government and operator concepts of transportation needs are greatly influenced by Federal policies, in spite of the Federal government's attempt to allow for local priorities.

II.C. Basic Transportation Needs in the New York Context

The examination of basic transportation needs on a national level provides a useful background for a consideration of basic transportation needs in a specific local context. The citizens of New York City, in addition to being the people most affected by the proposed actions of the Moynihan-Holtzman Submission, are uniquely qualified to comment on transportation needs and priorities.

Method of Analysis

Because the discussion is based on findings of survey research, special care must be taken in distinguishing transportation needs from transportation priorities. In the absence of any economic constraints or forced priorities, respondents to surveys will manifest agreement on virtually any positive need posed to them. Such subjective expressions of need have little meaning in an arena of limited resources; what is more relevant to the allocation of resources is the rank order of priorities that population groups assign to various needs.

Because the priorities of mass transportation users in New York City are examined in a later section (III.C) of this report, this analysis of basic transportation needs avoids discussion of transportation priorities as assessed via survey measures. Also avoided are subjective expressions of needs, as indicated by attitudes, in response to survey items, because these have--as already stated--only limited meaning in the absence of real economic constraints. Instead, this section will be confined to an assessment of the more objective indications of basic transportation needs, as indicated by behavior, that have been gathered by various governmental and public interest groups in the New York City area.

Thus basic transportation needs are defined here as what various groups in the population can be seen to need--by an independent analyst--by virtue of their objective geographic, demographic, economic and social characteristics (whether these are measured by private survey, government census, or some other means). Transportation priorities, by contrast, are defined here as the subjective rank orderings which users themselves give to various transportation needs when these are posed to them in general surveys.

The analysis of basic transportation needs in New York City focuses on the special needs of subgroups of the population as demarcated by five characteristics: (1) location of residence (the different boroughs or districts of the city); (2) age (with focus on the special needs of the young and elderly); (3) income (with focus on the particular needs of the poor); (4) racial and ethnic minorities; and (5) the handicapped. The essential strategy will be to attempt to ascertain, using all available survey data, the basic transportation needs that might be special to population groups defined by combinations of these characteristics.

A special note on the general consensus on the objective transportation needs of specific population groups is in order here. The review of the several government and private surveys reported here necessitated contact with representatives of various federal, state and local government agencies, and of various civic and public interest groups. From these contacts, there appeared to be little disagreement on the general transportation patterns observed for various population groups. Indeed, representatives from one agency or group readily cited data gathered by other agencies or sources.

Basic transportation needs in New York are also analyzed in terms of the two central modes of public transportation, subways and buses, with special attention given to frequency of ridership complaints about the system.

As discussed in the section on Study Methodology, this analysis of basic transportation needs is based on the study of our compilation of all available transportation surveys conducted in the New York City area in recent years. To facilitate reading of the text and thus consideration of the conclusions drawn, the Exhibits referred to have been grouped together in Appendix B.

Special Population Characteristics

Location of Residence: Of the approximately 7.9 million people in the five boroughs, about 1.9 million are covered by express bus service, and 4.9 million are covered by subway service (Exhibit II.C.1; the definition of coverage here is that of Wilbur Smith and Associates, based on 1970 Census data). From these figures we see that 26 percent of the people in the five boroughs are not covered by either express bus or subway, while 11 percent are covered by both; 13 percent are covered only by express bus, and 51 percent only by subway.

The lack of coverage by either express bus or subway service for 26 percent of the population may be considered a major transportation need of New York City. In Manhattan, this is only 9 percent of the population; it increases to 44 percent of the population of Staten Island and 45 percent of the population of Queens.

Exhibit II.C.2, a graph developed by the Regional Plan Association, shows utilization of various transportation modes as a function of distance from Manhattan: use of the subway increases as we move from central to non-central Manhattan and the Bronx, then decreases again. The bus is important to people located nearer the city center, while the automobile is increasingly used as one moves away from the central city.

Exhibit II.C.3 contains the results of a poll by Louis Harris and Associates, commissioned by the New York State Department of Transportation. It shows three means of transportation into Manhattan and the population groups that rely on them.

The table shows that Queens residents tend to rely more heavily on the automobile, while the subway is most useful to residents of Brooklyn. Express and local bus service is most useful to residents of Brooklyn. Express and local bus service is most useful to residents of Manhattan and the Bronx.

Age: Exhibit II.C.3 also provides data on transit use by age group. The young rely especially on the subway for transportation, while the middle-aged groups rely on the automobile, and the elderly rely on bus service. These patterns hold up well across the various other surveys of transportation that have been conducted in the New York City area.

Exhibit II.C.4 presents data on work trips by age categories. For transportation to work, younger age groups rely more on the subway, while older age groups rely more on bus service and particularly on walking. This latter mode reflects both the limited financial resources of many elderly, as well as the location of many in central urban areas zoned for business and other employment.

Exhibit II.C.5 presents data comparable to that in Exhibit II.C.4 but for nonwork trips; these are distinctly different in pattern from the work trips in the previous exhibit. The younger age groups, which are less apt to walk to work, are more likely to walk to nonwork activities. This is at least partly because of New York City work patterns: many young people are employed in the financial district of Lower Manhattan, where there is relatively little residential housing; hence they cannot easily walk to work but are not reluctant to walk (or must often walk) otherwise. The elderly age group, by contrast, relies more heavily on the bus for nonwork purposes.

Income: Exhibit II.C.6 examines transit use by income groups. Seen in this exhibit is a pattern that is not atypical of many other parts of the country: higher income groups tend to rely more on the automobile for work trips. The bus is used more by middle-income groups, while the subway is used predominantly by low and lower-middle income groups.

For nonwork trips, as shown in Exhibit II.C.7, the automobile is used extensively by all income groups, but particularly by higher income groups. The bus is much more important for nonwork trips, and for middle and lower income groups, while the subway is less important in general for nonwork as compared to work trips. Once again, these are patterns that persist across the various other surveys of transportation that have been conducted in the New York City area.

There is also a more complex interrelationship among population density, income and transportation mode, as illustrated in Exhibit II.C.8. Here there are three income groups: the upper 25 percent, the middle 59 percent, and the lower 16 percent. As the exhibit shows, notonly does the number of trips decline as a function of the density of location, it also declines as a function of income. As shown by the exhibit, for changes in the use of transit as a function of density, the differences among income groupings become more acute as a direct function of density. In other words, there are several extraneous factors acting simultaneously on the choice of transportation mode by income.

Exhibit II.C.9 illustrates transportation needs in ten of the poorest sections of New York City in 1969. As might be expected, availability of an automobile declines sharply as a function of family income. This illustrates one of the obvious basic transportation needs of New York City: the need for inexpensive mass transportation to get workers in poorer areas to and from work. Add to this the relationship illustrated in Exhibit II.C.10, that as the percentage of families with incomes under $4,000 (in 1969) in an area increased, and particularly in the ten areas of greatest poverty, the percentage of workers relying on public transportation increased--up to the 65 to 70 percent level. These data reinforce the conclusion that one of the obvious basic transportation needs of New York City is to get workers in poorer areas of the city to and from work.

Racial and Ethnic Minorities: Transit use by racial and ethnic minorities is displayed in Exhibit II.C.11 on work trips. As the exhibit shows, Whites are much more likely to use the automobile for work trips, while Blacks manifest extraordinarily heavy reliance on the rail and subway system. Spanish-Americans, in an interesting intermediate pattern, rely on rail and subway almost as much as does the Black group, and on the automobile almost as much as does the White group. This is at least partly due to the predominant patterns of Black, White and Spanish-American residences in the New York City area.

For nonwork trips, as shown in Exhibit II.C.12, the patterns delineated by racial and ethnic variables are somewhat different from those for work trips. The automobile remains predominantly the mode for Whites, the Black group shifts from rail and subway to the bus system, and Spanish-Americans rely even more heavily on the automobile.

The Handicapped: To examine transportation needs of the handicapped, we can consider Exhibit II.C.13, which shows that about 7 percent of the residents of New York City report that they have chronic health problems or are otherwise handicapped. This handicapped category varies from only 3 percent of the Queens population to about 10 percent of the population of the Bronx.

The implications of handicaps and other health impairments for public transportation in New York City are demonstrated in Exhibit II.C.14. Five distinct impairments afflict about two percent of those with health problems: these impairments include the inability to go up stairs, to go down stairs, to go up an incline, to stand for a long period of time, and to walk without assistance for more than a block. Two percent of seven percent means that about 14 of every ten thousand New Yorkers cannot perform easily each of these five basic functions (no data have been published on the overlap among these five categories). Not all of those so handicapped regularly use public transportation, to be sure, but the difficulties of many who do must nevertheless be counted among the basic transportation needs of New York City.

Central Modes of Public Transportation

The two central modes of public transportation, subways and buses, require separate assessments, Exhibit II.C.15 compares the reliance on various transportation modes in New York City with the rest of New York State. As might be expected, there is much less reliance on the automobile, and much greater reliance on the subway and bus, in the city than in the rest of the state.

Use of the Subway: As Exhibit II.C.16 shows, 77 percent of New York City residents use the subway for shopping trips. For recreation, according to Exhibit II.C.17, 89 percent of New York City residents travel via the subway. (It must be noted for both of these exhibits that the percentages are for ever used modes of transportation; the percentages in sum exceed 100 percent.) The frequency of subway ridership displays differing patterns across the boroughs, as shown by Exhibit II.C.18. Residents of Manhattan and Queens are more likely to rely on the subway only occasionally, whereas residents of the Bronx and Brooklyn constitute bimodal groups, with relatively larger numbers using the subway either every day or rarely. Brooklyn residents rely on the subway more heavily to get to work, as shown by Exhibit II.C.19, while residents of Manhattan and the Bronx use it more for shopping, and residents of Queens use it more for recreational purposes.

What do people think of the subway? As demonstrated by Exhibit II.C.20, over half the residents of New York City (52 percent) think subway service is getting worse; only two percent think it is getting better. It must also be noted that these results were obtained in a survey conducted in 1978, before the recent adverse publicity concerning violent crimes in the city subways.

Why are people dissatisfied with the subway? As shown by Exhibit II.C.21, dissatisfaction ranges from waiting times during rush hours to the hours of available service. Most dissatisfied are those who use the subway to get to or from Manhattan or the outer boroughs.

The magnitude of the rush hour on the subway is illustrated in Exhibit II.C.22. As is immediately evident from this graph, subway passenger traffic crests between eight and nine o'clock in the morning, and between five and six o'clock in the afternoon. This is at least one primary cause of dissatisfaction with the time it takes to travel during the rush hour; for those traveling outside of New York City, the level of dissatisfaction is 50 percent (Exhibit II.C.23).

At the same time, however, people at least perceive a shorter wait time for a subway in a rush hour than during a non-rush hour, and a shorter wait time for a subway than for a bus. During the rush hour, the waiting time ranges from 4 to 10 minutes, with residents of the Bronx and Queens perceiving a somewhat shorter waiting period. Durin the non-rush hour period, the perceived waiting time increases to 11 to 20 minutes, and there seems to be a consensus that it is about 15 minutes (Exhibit II.C.24).

What are the specific complaints people have about the New York subway system? Exhibit II.C.25 gives the answers: it is too crowded; they are terrified of conditions found walking to and from the subway; other passengers are rowdy; the lighting is poor (attitudes about subway fares will be discussed in Section IV.B.4). As for what people think about while they are riding on the New York City subway, it is worth noting that 11 percent of all passengers report they think about the safety of the ride (Exhibit II.C.26).

Use of Buses: Ridership on New York City buses over the past ten years has slowly leveled off at almost 400,000 per week. (Exhibit II.C.27) and the largest group of riders is made up of persons earning between $3,000 and $9,000 a year (Exhibit II.C.28). Rush hour on the buses is not quite as acute as it is on the subway. It is also spread over a larger time period: from 9 to 10 o'clock there is a "second rush hour" of morning shoppers (Exhibit II.C.29).

What do people think about rush hour travel on the bus? The perceived waiting period is from 4 to 15 minutes during rush hour and is somewhat longer in the Bronx. The perceived waiting time during non-rush hours ranges from 11 to 13 minutes and again is longer in the Bronx (Exhibit II.C.30). Complaints include that buses do not run often enough, that they are not dependable, that there are not enough routes; these complaints are roughly the same magnitude as complaints with bus service across New York State. Complaints that one cannot depend on the schedule of buses, however, are much more frequent in New York City than in other urban areas of the state (Exhibit II.C.31).

Analysis of the basic transportation needs of New York City, at least as defined by objective geographic, demographic, economic and social characteristics of residents, as measured by all of the recent surveys of the city, both government and private leads to the conclusion that there is no reflection of an overall feeling of a specific need, nor a particular dissatisfaction with current service, in these data, but rather a cacophony of competing dissatisfactions and perceived needs among various residential, age, income, racial and ethnic categories, and special interest groups like the handicapped.

For this reason, the word "need" is inappropriately objective and artificial in the current context. New York City does not have transportation "needs" so much as it has competing interests toward changing and improving public transportation. The surveys reviewed in this section establish these interests as possible trade-offs for further action, but only the political process can establish in whose interests each new transportation dollar will be spent.

II.D Justification of the Basic Transportation Needs Definition in the Moynihan-Holtzman Submission

Basic Transportation Needs Defined in Moynihan-Holtzman Submission

Five basic transportation needs are defined in the submission:

Fare Stability: It has been the expressed policy of the State government to hold the New York City transit fare constant at the present level until 1981. Fare stability is defined to mean no abrupt increases in fare. In the past, fares remained constant for a period of years and then abruptly increased, typically by 30 percent or 40 percent, as operating costs, especially wages, went up. Such increases distress the public and result in reduced patronage. The fare stability policy advocated by the State favors increasing the fare at a gradual level each year at a rate of increase less than the increase in the cost of living.

Operational Safety and Reliability: The submission states that the transit system should provide a transportation alternative which is as safe or safer than automobile travel. Reliability refers to the need to maintain current levels of on-time performance.

Comfort: The Moynihan-Holtzman Submission specifies three measures of improving comfort: reduce crowding, especially during certain times of the day in certain areas of the subway system; reduce subway noise levels; provide air conditioning for the subway system and buses.

Environment and Security: There is a basic need to maintain a transit system whose stations are clean, well-lit, in good repair and free from crime.

Availability and Convenience of Service: There is a basic need to insure that the public transportation system has convenient connections and adequate coverage of the metropolitan area. Further, there is a basic need to insure that the system will be accessible for use by elderly and handicapped individuals.

Rationale For Basic Needs Definitions in Moynihan-Holtzman Submission

In establishing these five areas as basic transportation needs, the State is acting in accordance with its particular function as a provider of public transportation.

Within New York, responsibilities for planning, funding, and operating public transportation are divided among several government levels. Planning for transportation needs and mass transportation systems is accomplished primarily at the city level by metropolitan governments and community planning boards. Transportation planning also takes place at the regional level by the Tri-State Regional Planning Commission. Operating and funding responsibilities, however, are largely discharged at the State and Federal level. There are clear cut distinctions among levels and functions, but a certain amount of overlap occurs. The primary responsibilities of the State agencies involved with transit are in operating and funding, rather than planning, and the Moynihan-Holtzman Submission reflects that viewpoint. The perspective of the authors of the submission is clearly different than that of the New York City Planning Commission, although the Submission draws heavily on CPC stated needs. While the Moynihan-Holtzman Submission advocates the needs of the city, it advocates those needs in the context of competing needs of other metropolitan areas within New York State. The State may find that if it specifies certain basic transportation needs for the New York metropolitan area, it may be called upon to support those standards as appropriate for other areas in the State. Since the submission has been prepared by agencies involved in operating and funding, it attempts to balance desirable and ideal levels of transportation service with available funding levels. As an implementation plan, the submission must be realistic and implementable.

There are multiple interpretations of basic transportation needs given in the submission. First is a general definition of needs as the amount and type of investment needed to achieve a given standard or set of standards. Also mentioned are unrestrained needs, which are defined as those types and amounts of investment needed to meet ideal standards. Plan level needs are mentioned as those put forth by the New York City Planning Commission. Plan level needs are those required to meet desirable standards.

In response to the Moynihan-Holtzman Amendment, the submission deals with "basic" needs, which are defined by the State to be those improvements and investments needed to keep the system going. One can defend the State's interpretation of basic needs on two points. First, the existing public transportation system in New York City and the surrounding region is the largest transit system of any city in the United States and is among the largest in the world. More New York residents ride public transit than in any other area, and New York public transportation is available as an alternative to the automobile.

Second, there is a strong commitment by government to provide funding and public transportation service in the region; this commitment extends to all levels of government and has been manifested in Federal policy as well. The submission, therefore, contains an interpretation of basic needs which the State believes is relevant to the New York situation and draws on local priorities. Such a definition of basic needs may not be common to other areas in the United States where transit service is not quite as pervasive.

II.E Critique of the M-H Submission Definition of Basic Transportation Needs

The definition of "basic transportation needs" in the Moynihan-Holtzman Submission is such that "needs" are financial resource requirements, i.e., dollars. It is very clearly stated in the report that the various elements of basic transportation needs are stated in terms of X dollars for this and Y dollars for that. The focus on the dollar requirement is so pointed that the physical, operational, and managerial improvements to transportation systems are presented as if they are of secondary importance. Rather than focusing on the mobility requirements, the report focuses on the financial resource requirements.

Certainly the financial resources necessary to implement transportation improvements are of utmost importance; however, basic transportation needs are the mobility requirements of the people that work and live in New York City. These mobility requirements include being able to get from point A to point B in reasonable comfort, within a reasonable time, at a reasonable cost. These are the needs, and those aspects of the existing transportation system that require improvement or maintenance so that the mobility requirements of the area are satisfied should have been the primary focus of this report. The money necessary to achieve those mobility ends is important but only intermediary to those basic transportation needs.

The five problem areas of transportation improvement and maintenance identified in the Moynihan-Holtzman Submission and listed above are, at several points, termed "needs", as they should be; however, the financial requirements, rather than the solutions for the problem areas are emphasized as the needs. The five areas are simply presented without any priority being stated, except for what can be inferred from the financial resources allocated to each.

The five areas defined seem to be adequate categories that are sufficiently broad to include transportation needs as derived from either operational, political or user points of view.

However, it is the consensus of the study team that all relevant definitions of basic transportation needs are rooted in the need to maintain mobility for individuals. Other transportation-related policies, such as economic development, energy conservation, environmental protection, and income redistribution, all influence the viewpoints of actors in the provision of transportation funds and service. However, these aspects serve only to constrain or modify the requirements for individual mobility. Thus, in order to be most responsive to the needs of individuals, the drafters of the Moynihan-Holtzman Submission should have adhered to a definition of basic transportation needs which more explicitly advocated the user's point of view.

III. PERFORMANCE, STANDARDS, AND PRIORITIES IN FULFILLMENT OF BASIC TRANSPORTATION NEEDS

III.A Standards Used in the Moynihan-Holtzman Submission

In the previous chapter, the five categories of basic transportation needs found in the Moynihan-Holtzman Submission were presented. In order to determine the degree to which these needs will be satisfied by various transit improvements, it is necessary to establish standards against which one can measure system performance. In this chapter, the specific standards proposed by the state are presented and discussed. They are compared to industry standards and evaluated with respect to local priorities.

The standards presented for the five basic transportation needs defined in the Moynihan-Holtzman Submission are as follows:

Fare Stability: Transit fares should remain constant with respect to the cost of living through 1981. This standard is stated; no supporting documentation nor justification for such a standard is presented.

Operational Safety and Reliability: With respect to safety, the region's public transit system is to be as safe or safer than the automobile and not substantially more unsafe than comparable transit systems around the country. With respect to reliability, only a tentative standard of 90% average daily reliability is set. This reliability standard is presented vis-a-vis vehicle on-time performance, rather than person-trip on-time performance.

Comfort: For two comfort parameters, crowding and noise, standards are discussed but none are presented. A strong standard is put forward for air conditioning and heating units.

Environment and Security: Only transit stations are included in the discussion and the standard is that they be "secure from crime and vandalism, brightly lit, supplied with easy to understand signs, kept in good repair and kept clean of litter, dirt and foul odors."

Availability and Convenience of Service: The standard is pointedly stated as "...a system serving 90% of the population in dense...areas with an arrangement of routes that is convenient for travel desires and about which information is both comprehensible and available." An additional aspect to the standard addresses the special mobility needs of the handicapped and elderly by stating that their mobility needs be "met at a reasonable cost."

III.B. Comparison of MHS Performance Criteria With The Transit Industry

Unfortunately there are no criteria for transit performance that are accepted as industry-wide "benchmarks." There are no universally accepted performance measures, standards for these measures, or definitions of the few criteria which are commonly used. The standards for the five basic transportation needs set forth in the Submission are each examined in terms of the following four areas:

1. Performance of comparable transit systems in the U.S.
2. Criteria and standards proposed by other metropolitan area planning agencies.
3. Internal consistency of the submission.
4. Consistency with plans and concepts of other organizations which deal with New York City transit.

Each of the five basic transportation needs will be presented and discussed individually.

Fare Stability

The fare stability criteria allows the fare to increase at a rate no greater than the cost of living, through small annual increases. The economic viability of the stabilization will be addressed in detail in Chapter V.

Fare stabilization falls under the broader heading of fare policy and pricing. Industry wide, the issue of fare structure is receiving close examination because of the rising deficits facing transit operators. In general, pricing policies affect two basic areas: revenue and ridership. Fares can be set to increase revenue or ridership. Increased ridership increases transit usage and promotes other community goals, i.e., improved mobility for various user groups, energy conservation, reduction of air pollution, etc. (Public Technology, Inc., 1977). Fare stability is a policy aimed at increasing ridership rather than revenue.

With the exception of particular segments of the population and certain non-essential trips, transit ridership, in general, has a low sensitivity to fare. The sensitivity is, however, strongly influenced by the manner in which fare changes are instituted. Figure III.B.1 shows a history of ridership on the New York City system superimposed with a time plot of fare. The NYC fare policy has been to implement changes in quantum jumps as opposed to gradual increases.Although declining ridership can be attributed to many causes, when major fare increases occur (as in 1949), a significant decrease in ridership results. A smaller change in fare gives rise to a smaller decline in ridership levels; this is substantiated by the New York transit ridership data.

Nationwide, fare structures are becoming more sophisticated. In attempting to make fares more equitable, many urban areas have implemented (or are contemplating) fare structures which are distance and/or time-of-day dependent and offer reduced rates for certain select groups (school children, elderly, etc.). The fare structure in NYC is the conventional flat fare with

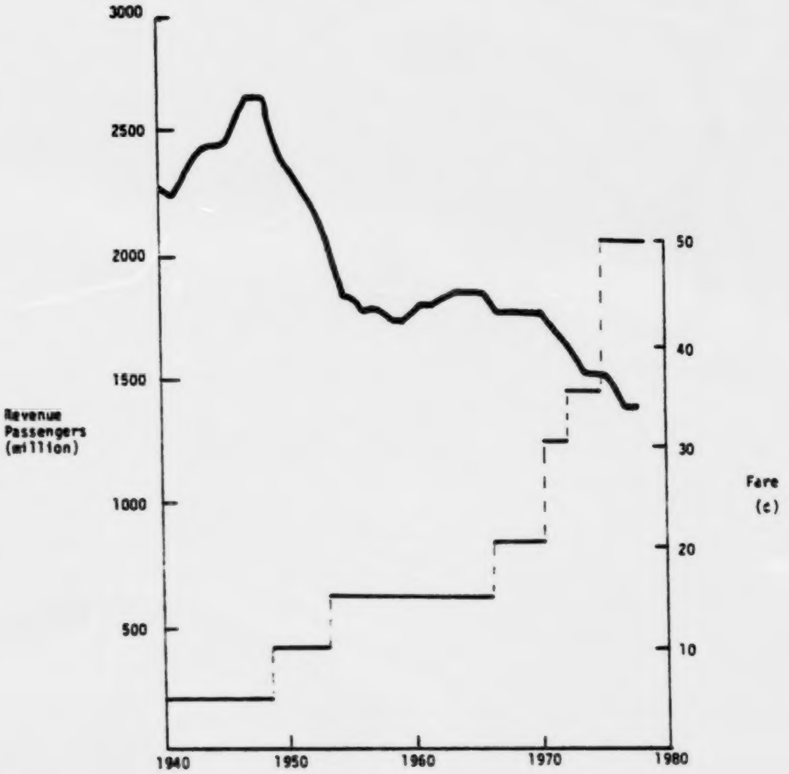

Figure III.B.1
NYC Transit Ridership and Fare History

some groups receiving discounts. Implementing a more sophisticated fare structure requires concomitant sophistication in fare-collection equipment, such as the magnetic fare cards used on the Washington, D.C. Metro system. However, the size of the NYC system and the lack of reliable computerized fare-collection equipment make the implementation of complex fare structures inadvisable at this time.

From policy, planning, and operational points of view, fare stabilization is a logical objective. However, the economic consequences of this policy may very well negate its advantages. This is discussed in detail in Chapter V. It should be noted, however, that fare stability, when defined as a continuing pattern of small annual increases, may prove to be a political liability for elected officials. The public would be faced with repeated annual fare increases which might prove embarrassing to incumbent officials, who would be criticized for their inability to contain rising costs. It may prove easier for officials to seek larger increases at less frequent intervals, particularly in years when no elections are pending.

In the long run, more sophisticated fare structures may prove not only more equitable, but politically more acceptable, since fares could be raised or lowered for selected areas within the region, or for selected services, or user groups, rather than for the metropolitan area as a whole. It would even be possible to lower some fares while simultaneously increasing others. With the current fare structure, differential increases or decreases are possible, but only on a gross scale.

Operational Safety and Reliability

Safe, reliable service is the fundamental goal of any transit system. Safety and reliability will be examined separately.

Safety: The standard for safety proposed in the Moynihan-Holtzman submission is two-fold: (1) the system should be as safe, or safer, than the automobile, (2) the accident rate should not be substantially greater than that of comparable transit systems in the U.S. Initially, one would believe the above standard to be quite appropriate; however, deeper consideration reveals that the standard is meaningless with respect to improving or even maintaining the current level of safety in the New York system.

First of all, transit has been shown to be a much safer mode of transportation than the automible; consequently, the first part of the proposed standard is completely superfluous to assuring a safe transit system.

Compared to other large transit systems, the New York system has a remarkable record of safety (Mass Transit, 1978). Shown in Figure III.B.2 is a comparison of operational safety for the major U.S. transit systems. Safety is measured in terms of accident rate (accidents per million vehicle-miles). This accident data, reported to the Federal Railroad Administration, is for only one year, 1976. As can be seen, the accident rate (excluding New York City Transit Authority, NYCTA) varies from 0.2 for Philadelphia (SEPTA) to 1.3 for Cleveland (GCRTA). The average accident rate for the eight systems (excluding NYCTA) is 0.54 accidents per million vehicle-miles. The NYCTA accident rate is 0.06; consequently, number of accidents could increase over 9-fold and still the system would satisfy the proposed safety standard.

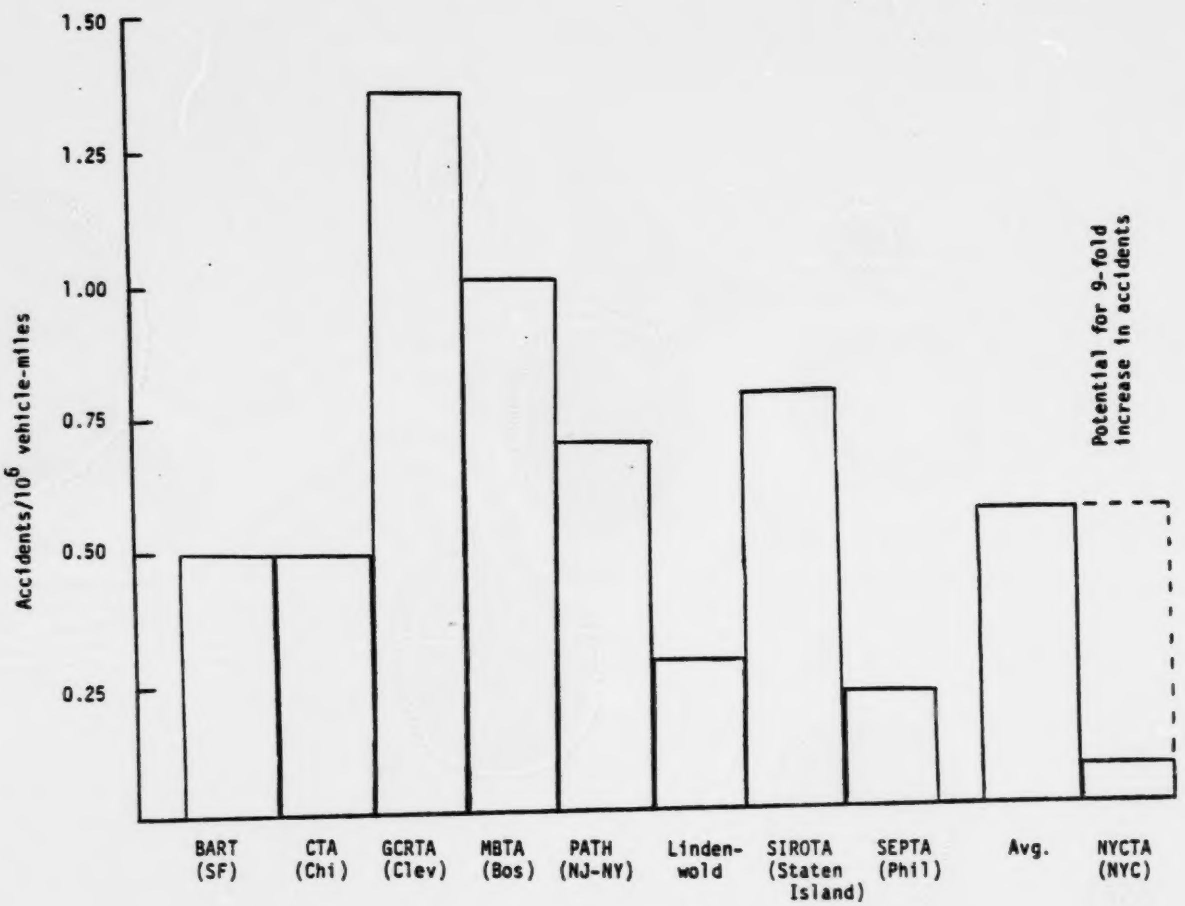

Figure III.B.2
1976 Accident Rate for Major U.S. Rapid Rail Transit System

NYCTA records passenger incidents on an annual basis. Incidents reported are occurrences which may or may not have resulted in personal injury or property damage (NYCTA,1975). As distinguished from accidents, incidents may not necessarily involve train operations. Rock throwing, slipping and falling are examples of incidents. Figure III.B.3 shows the ten-year trend in the passenger incident frequency rate (incidents per million passengers carried) for NYCTA. This historical perspective indicates that the NYCTA is a relatively safe system and that safety is steadily improving.

Dade County, Florida is in the planning stages for a private right-of-way transit system. Their proposed safety standard is that passenger safety "should exceed, or at least be equal to, that of the safest major rapid transit system now operating in North America" (Kaiser Engineers,1975).

The objective of criteria and standards is to promote the improvement or, at least maintenance, of existing characteristics of the system. In this case, the proposed safety standard is unduly lax to the point that the level of safety could be substantially degraded. The Moynihan-Holtzman Submission should adopt a more stringent standard to meet the basic need for safety.

Reliability: An issue paper from a recent conference on transit performance (Public Technology, Inc.,1978) states that:

Transit service is reliable when:

- schedules are adhered to
- no scheduled trips are missed

The state defines operational reliability in terms of the average on-time performance of the system. On-time is defined in the submission as being no more than four minutes late. The average is calculated with abandoned (annulled) trips excluded; consequently, if a train or bus is taken out of service, it does not affect operational reliability. This definition is totally system-

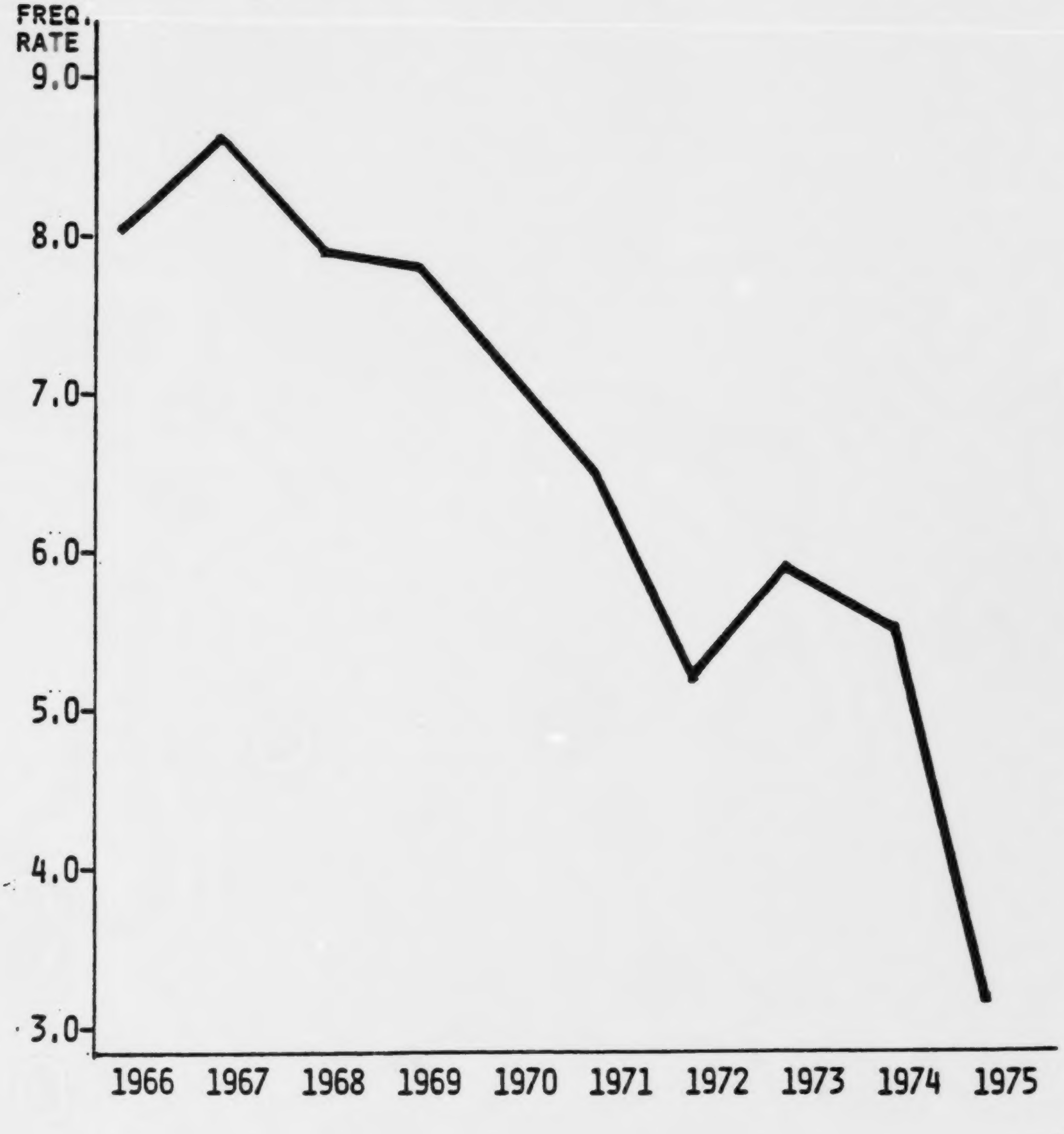

Figure III.B.3

Passenger Incident Frequency Rate as Reported by
The New York City Transit Authority
(NYCTA [1975])

oriented rather than user-oriented.

The reliability standard proposed is 90 percent, i.e., on the average 90% of the trains and buses should adhere to within four minutes of their posted schedule. The following aspects of this standard make it distinguishable from other proposed reliability standards: first, the single standard is inclusive of private right-of-way (r-o-w) modes (subway and commuter rail) as well as buses which compete for space with the automobile and taxi. Private r-o-w vehicles should maintain better schedule adherence and therefore support a higher standard of reliability (Pennsylvania Department of Transportation (Penn DOT),1973). Second, the standard is independent of scheduled time headway. It is generally accepted that schedule adherence is more critical to routes with long time headways and less for short headways (Penn DOT,1973; Public Technology, Inc., 1977). Third, the definition of "on-time" varies: according to N.Y. State, on-time is 0.4 minutes late; according to Penn Dot, on-time is 0-5 minutes late; according to Maryland-National Capital (1978), on-time is not more than one minute early, nor three minutes late. Consequently, it is impossible to critique the specific standard of 90% proposed by the State.

Table III.B.1 presents the operational reliability standard adopted by Penn DOT (1973). A reporting requirement is specified if the standard is not satisfied. That is, the public must be notified of the cause and expected duration of the delay. Such a requirement is not addressed in the state's submission. The 1977 on-time performance statistics for New York City transit, as presented in the submission, are given below:

Subway: 98% with 1% Annulled*
SIRT: 97%
LIRR: 87%
Conrail: 89%
Bus: 95% with 4% Annulled

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*The Department of City Planning (1978) indicates that the subway annullment rate is 2% whereas the submission states 1%.

TABLE III.B.1

Operational Reliability Standard
from the Pennsylvania Department of Transportation
(PennDOT [1973])

SII-B9: On systems operating exclusively on private rights-of-way, at least 95 percent of trips should operate on time.* For surface lines, the schedule adherence criteria can vary with quantity of service provided as shown by the following table:

SCHEDULE ADHERENCE:

Minimum percent of service on time

TIME PERIOD	HEADWAY		
	0 - 10 minutes	10 - 30 minutes	Special
Peak hours	75	85	95
Off-peak hours	80	95	95
Weekend	80	95	95

Where percentages of service fall below these minimum standards, the agency shall submit an analysis of delays and a discussion of possible improvements. Common causes include:

1. General traffic delays
2. Mechanical failures
3. Emergencies and inclement weather
4. Unusually frequent or prolonged passenger stops
5. Unrealistic schedules
6. Inadequate layover periods

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* On-time operation is 0 - 5 minutes late.

It should be noted that "basic transportation needs" refer to personal mobility; however, the state's definition of reliability is totally system oriented. In order to make reliability standards relevant to the basic transportation needs of users, it would be necessary to adopt new kinds of reliability measures. For example, system-wide performance standards tend to obscure the fact that some lines operate on-time in non-rush hours, but have severe delays regularly during rush hours. On-time performance standards should be applied to each line, by time of day, and possibly weighted by the number of users who are inconvenienced. Similarly, a single criterion for on-time performance, such as being less than four minutes late, does not adequately measure the extra time penalty a user must typically add to his travel time to be certain of arriving when planned. However, user-oriented criteria such as the above are not yet accepted by the transit industry, and considerable research would be necessary to determine the most appropriate measures and performance levels.

Comfort

The comfort criteria are divided into three basic areas: crowding, air-conditioning, and noise. For crowding the standard is available floor space per passenger during the peak hour; the proposed standard is four square feet per passenger. This is at the very low end of the "reasonable accepted" level for crowding conditions as put forth by the Department of City Planning (1978). The Tri-State Regional Planning Commission suggests five square feet per passenger. The Pennsylvania Department of Transportation (1973) says that the amount of floor space should be dependent upon the trip length. For less than 15 minutes trip time, five square feet per passenger would be sufficient. For longer trips, all passengers should be seated. Five square feet per passenger basically implies that for every seated passenger one will be standing.

The Regional Planning Association states in the Region's Agenda (1978), "The service quality provided in this Region is far below the standards in the rest of the nation. Despite declines in patronage, New York subways remain over-crowded. Of the 21 rapid transit tracks feeding Manhattan, 70 percent provide less than five square feet of vehicle floorspace per passenger during rush hours and often between rush hours; in the rest of the country, only 24 percent of the 30 tracks entering the other eight downtowns with rail provide less than this standard."

Initially one might think that increasing the number of trains or cars per train would be sufficient to alleviate this problem. However, some lines are currently operating at or near capacity (DCP, 1973). To achieve the more universally accepted standard of five square feet per passenger would require either new subway construction or substantially improved bus lines to attract riders from the subway. Neither of these alternatives is discussed by the state.

The second aspect of comfort is air conditioning. The submission states that eventually all vehicles will be air conditioned. The Penn DOT 1973 guidelines indicate that "if prudent" air conditioning should be provided, and there is no generally accepted standard with respect to air conditioning.

There are four issues germane to the discussion of air conditioning (AC) which the state does not address:

1. Days in operation--New York City's climate would permit air conditioning to be used for only a few months during each year.
2. Reliability and maintenance requirements--AC units, like all mechanical equipment, will require servicing. Will a vehicle be taken out of service if the AC is not operating? If not, is the vehicle satisfying this basic standard?
3. Light-weight power rails--several segments of the subway system are equipped with power rails that are of insufficient size to handle the additional load of the AC units (DCP, 1978).
4. Energy usage--to conserve energy, President Carter set a minimum level of 78° F. for summertime temperatures in air conditioned public

buildings. AC requires excessive amounts of energy and also generates heat which is exhausted into the already hot subway tunnels. This will increase the heat at the stations and the load on the AC units themselves.

The third area under comfort is noise. The submission states that the system is too noisy but that specific noise standards have not been set. The age and condition of vehicles and rails are factors greatly influencing transit system noise levels--interior, in-station and in-community. Data presented in the report "Noise in the New York City Transit System; Abatement Methodology and Cost Estimate" (McShane and Slutsky, 1975) support the premise that the NY system is as noisy or noisier than the Boston system, which is also considered to be too noisy (Kurzweil, et al 1974).

The three areas of comfort--crowding, air conditioning, and noise--are treated independently in the Submission; however, a certain interaction does exist. In-vehicle noise levels can be reduced if the vehicles are air conditioned because the windows would remain closed. In addition, crowding is less critical if in-vehicle temperature and humidity are controlled. These interactions are not fully treated in the Submission.

Environment and Security

The submission states that the station which meets the standards for basic needs will be secure from crime and vandalism, brightly lit, supplied with easy to understand signs, kept in good repair and kept clear of litter, dirt and foul odors. Similar statements are made in the guidelines from the Pennsylvania Department of Transportation (1973) with respect to stations.

There are two aspects of security: crime and vandalism. One of the problems with actually assessing rates and developing standards appropriate for crime is the absence of systematic and accurate reporting. In addition, there is a significant disparity between actual crime levels for transit and the crime levels perceived by potential users, and that is the real root of the problem.

Comparison of crime rates for various systems must be viewed with skepticism due to the lack of systematic reporting. The following crime statistics are presented merely to illustrate that the occurrence of crimes in the NYC transit system is not significantly higher (or lower) than comparable systems in the U.S. Figure III.B.4 presents the reported 1971 transit crime rate (total acts of crime per 100,000 revenue passengers) for systems in Boston, Chicago, New York City, and Philadelphia (Thrasher and Schnell 1974). It appears that the transit crime rate is not significantly higher than elsewhere; user perceptions, however, might be otherwise. This is discussed in Section III.C of this report.

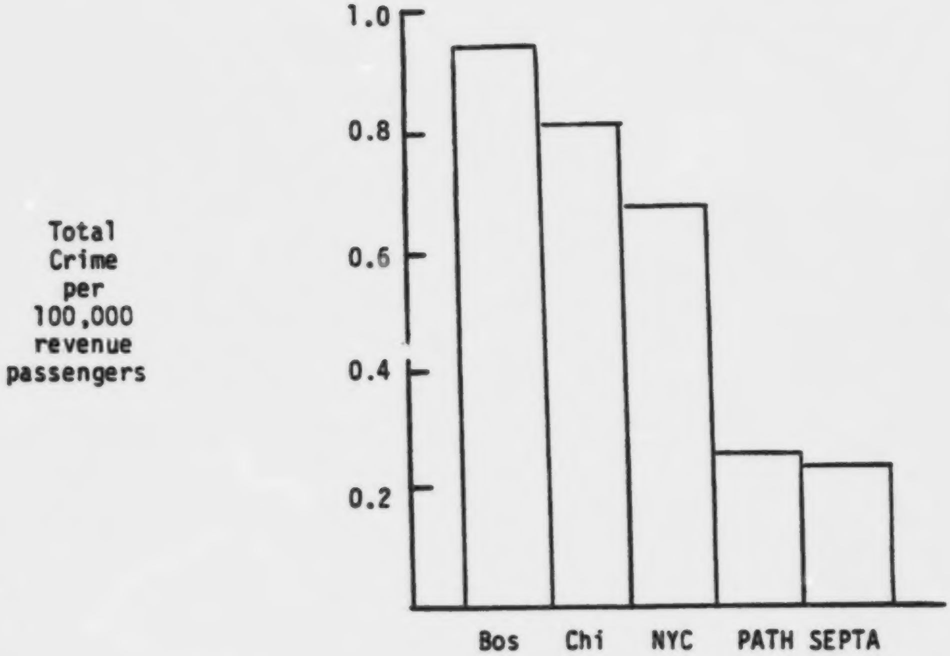

Figure III.B.4

1971 Transit Crime Rate for Major U.S. Rapid Rail Transit System

Availability and Convenience

The availability and convenience of transit are two characteristics which significantly affect a tripmaker's decision to use transit. In general, transit ridership is more sensitive to the quality of service than to the cost; consequently, transit availability and convenience are fundamental attributes if transit is to be a viable alternative to the auto.

The standard for availability proposed by the State is that 90% of the population in the dense portion of the city should be served. However, "service area" and "dense portion" are never defined. No indication is made as to the accessibility of transit to employment, commercial, and recreational opportunities in the area.

Convenience is defined in terms of arrangement of routes, comprehensible and available information, and assurance of mobility for the elderly and handicapped. No performance measures for convenience are addressed in the submission. A typical measure of transit convenience is travel time ratio: the ratio of transit travel time to auto travel time (Sloan,1979). The directness of service defined in terms of the frequency and delay incurred by transfers is another measure of convenience (Alter,1978).

With respect to the bus operations, there are three operational inadequacies that detract from its convenience (DCP,1978):

1. Antiquated route structure--existing routes are essentially unchanged from the original routes which follow the old trolley-car lines, though travel patterns have shifted from the earlier years.
2. Inequitable transfer policy--not only are the bus transfer policies inequitable, they are not well publicized. DCP (1978) cites examples of trips for which the fare for one direction is 50 cents while the return fare is a dollar.

3. Incomplete and unavailable information--a major deterrent to transit usage is the lack of knowledge of how to use the system.

The issue of transportation needs of the elderly and handicapped is insufficiently addressed in the submission. Major equipment, station, and operational changes must be instituted to accommodate the "basic transportation needs" of the elderly and handicapped, but the entire issue is avioded.

Criteria Omitted in the Submission

Throughout this section various definitions, criteria, and standards used by other organizations were discussed. Criteria which are relevant to "basic transportation needs" but omitted in the State's Submission are presented: 1) Although not strictly a user-oriented criterion, vehicle utilization is an important measure of system performance. Effective use of equipment minimizes cost and maximizes performance (Fielding, Gauthier, and Lave,1977). 2) If transit is to be a viable alternative to auto use, the relative travel times and costs for similar journeys by auto and transit must be considered and used as a performance standard for the system (Penn DOT, 1973). 3) With respect to directness of Service, convenient transit implies few transfers and minimal delay (wait time) at the transfer points (Alter, 1978). 4) Criteria to measure the effectiveness of marketing programs to insure that the public is made aware of transit service and incentive programs to make transit more attractive (Penn DOT, 1973). 5) Finally, basic transportation needs refer to the mobility of people, not the movement of vehicles; consequently, performance criteria, definitions, and standards should be user-oriented (Alter, 1978).

III.C. Local User Priorities in Evaluating Performance

While the evaluation of performance standards and criteria presents planners' projections and goals for the functioning of a transit system, the evaluation of performance by users of a transit system provides insight into the assessments and priorities of those experiencing the system as it exists. Therefore, this section is devoted to the priorities of local users in evaluating performance. Like Section II.C on the basic transportation needs themselves, this section is based on findings of survey research. Unlike Section II.C., however, this section will give lesser weight to objective geographic, demographic, economic and social characteristics as determinants of transportation needs, and much more wieght to an assessment of subjective expressions of personal priorities. Transportation priorities are defined here as the subjective rank orderings which local users themselves give to various personal transportation needs when these are posed to them in general surveys. The discussion here will review public expressions of interest in each of seven general areas: hours of service, proximity of routes, waiting time, on-time service, travel time, security, and fare structure. Particular interests and priorities in transportation improvements will also be considered. The survey data discussed can be found in Appendix C.

General Concerns Expressed

Security: Technical industry standards for measuring crowding on mass transit (presented in Section III.B.), stated the criteria in terms of square feet per person. From the transit user's perspective, such objective standards are not nearly as important as several more subjective ones: possible sexual, racial and ethnic differences with other passengers, perceptions of their personal cleanliness and hygiene, and perceptions that they will inflict physical injury. These are the unspoken variables of suspicion, prejudice, and fear just beneath the surface of survey questions like "Do you feel comfortable with the kind of people riding on the -----?" Women tend toward greater use of the bus, for example, while men more strongly favor the subway; hence user perceptions of these modes are colored by perceptions of their typical riders.

Do New York City residents feel comfortable riding the bus and subway? The available survey data reveal considerable feelings of insecurity, especially for women on the subway. In addition, it must be noted that all of these data were obtained before the recent adverse publicity concerning violent crimes in the city subways; hence current surveys are likely to report even greater feelings of apprehensiveness.

Hours of Service: In examining the degree of public staisfaction with the buses as compared to subways, one sees that although people are relatively satisfied with the hours of both, there is somewhat more dissatisfaction with buses; this is especially true for those who have no choice but to ride buses. Comparing automobile drivers with nondrivers, one finds much the same patterns: greater dissatisfaction with the hours of buses compared to those of subways.

Proximity of Routes: Does public transportation in New York City take people where they want to go? There seems to be general consensus that this is indeed the case. Especially for commuters whose trip origin is Manhattan, there is relatively substantial agreement that public transportation takes them where they want to go.

Waiting Time: There seems to be relative satisfaction with the waiting time for transportation service, even during rush hour, and especially among males for the wait for the subway. Satisfaction with the waiting time for buses is at approximately the same level.

On-Time Service: In comparisons of automobile, bus, and subway travel during rush hours, there appears to be somewhat more dissatisfaction with delays of the automobile; the subway, by contrast, seems to satisfy riders with its on-time performance, once again doing substantially better than the bus. Comparing these three modes by destination of the commuter, we find particular dissatisfaction with the automobile for those bound for Manhattan or outside of New York City; there is about the same degree of dissatisfaction with the subway.

Travel Time: Surprisingly, people who are able to choose the automobile over alternative means of transportation available to them tend to be dissatisfied with their travel time, while those who have no viable alternative to the automobile tend to find travel time much more satisfying. As one might expect, there is more satisfaction with the performance of the subway among those who choose to take it. Once again, there is comparatively greater dissatisfaction with the travel times of all three modes of transportation, even comparing automobile drivers with nondrivers.

Fare Structure or Cost: There is not much difference between buses and subways in terms of user satisfaction with fare structure. In general, users tend to express more dissatisfaction with fares than do non-users. For example, automobile drivers are more dissatisfied with the cost of the automobile than are nondrivers, while subway riders are more dissatisfied with subway fares than are nonusers. It should be noted that all of the data reported here were obtained *before* the most recent gasoline crisis, although it is not clear what effect this might have had on the structure of survey responses concerning the costs of sutomobile travel relative to the fare structure of other transportation modes.

Particular Interests and Priorities in Transportation Improvements

As mentioned in Section II.C, respondents to surveys will manifest agreement to virtually any positive need posed to them, a fact which must be weighed seriously in considering the *absolute* percentages of positive responses to various needs. The *relative* percentages of responses, by contrast, can serve as a useful indicator of the rank order of public priorities, which is the definition of transportation priorities--as obtained via survey methods--that is employed here.

An alternative means of assessing transportation priorities using survey research methods is to ask respondents to rank order a set of measures *directly*. This technique has the shortcoming that rankings will depend, in part, on what other measures are offered in the same set.

When asked directly about what transportation improvements they would like to see, respondents listed the following (in order): more rush hour buses, a guaranteed seat, around-the-clock operations. In another study comparing the priorities of men and women, the same three items were ranked by both sexes in the same three top positions:

1. safety
2. clean vehicles
3. on-time arrival.

After these items, priorities differ somewhat between men and women.

It is important to note that cost was given lower priority than the above three items by both men and women; it was ranked fourth by men and fifth by women. In general, the cost of travel is considered important--but by no means most important--in a wide range of different studies of the various transportation modes.

In general, there is considerable satisfaction with hours of service, proximity of routes, and waiting time; somewhat less satisfaction with on-time service and travel time; and widespread apprehensiveness about security. Fare structures and costs are important--but not overwhelming--priorities among New York City transit users. Factors like safety, cleanliness, guaranteed seats, and rapid, on-time arrival appear to be among the priorities users might consider before the stability of transit fares.

III.D. Local Government Priorities

Making the transition from the perceived public attitudes discussed above to priorities as expressed by government is somewhat difficult. The only measure of government priorities that one can reasonably examine is the way in which government allocates public monies. Thus, one can consider relative expenditure levels for the five categories of basic transportation needs defined by the Moynihan-Holtzman Submission as indicative of the priority level assigned them by the government.

The biggest of the five categories is clearly fare stability. Indeed, the order in which the five categories are presented in the Moynihan-Holtzman Submission is a rank ordering by level of expenditure. Relative to past funding levels, the Moynihan-Holtzman Submission proposes to virtually double expenditures in every category. It should be noted that many categories of transit spending are subsumed under the heading of "fare stability," and it is difficult to discuss funding need categories separately. In order to evaluate the relative funding of various categories of transit need, one must assume a more or less fixed total subsidy for transit, and a variable total farebox revenue contingent upon fare level and ridership. Thus, a rise in fare would lead to increased revenues which could, in turn, release subsidy funds for other categories. Likewise, to hold the fare constant, with a fixed subsidy, requires shifting funds away from various improvement categoriesto cover increased operating and maintenance costs.

One should look at the relative rankings of the expenditures in each different category and the changes implicit in the Moynihan-Holtzman Submission. Table III.D.1 presents a priority index based on per capita expenditures for Fare Stability, Operational Safety and Reliability, Comfort[1], and Environment and Security. Cleanliness and convenience are not considered because the Moynihan-Holtzman Submission does not contain itemized expenditures for those aspects of transportation. The index is constructed using per capita expenditures on Fare Stability as a basis, designated as 100 for both past and proposed funding levels.

Looking at past expenditures, it is clear that fare stability has been more than three times as important as the next highest category, operational safety

[1] For purposes that are apparent in other parts of the analysis, expenditures for new or renovated buses or transit cars are included in the comfort (air conditioning) category rather than the operational safety and reliability category.

TABLE III.D.1

PRIORITY INDICES

FOR EXPENDITURES ON THE VARIOUS CATEGORIES OF BASIC TRANSPORTATION NEEDS

(PAST AND PROPOSED)[1]

	PAST	PROPOSED
Fare Stability	100	100
Operational Safety and Reliability[2]	30	21
Comfort[2]	24	17
Environment and Security	5	7

[1] Past is based on average for 1975 through 1978. Proposed is average annual expenditures for basic transportation needs. Both are taken from the Moynihan Holtzman Submission.

[2] Expenditures on new and renovated buses or transit cars are included in the comfort category rather than the operational safety and reliability category.

and reliability. Fare stability was four times more important than comfort and twenty times more important than environment and security. This presumably reflects political realities in New York City.

When the indices for proposed expenditures are examined, it appears that comfort, operational safety and reliability will receive smaller proportions. Fare stability will increase to five times the level of funding for operational safety and reliability, and six times more than comfort. Only environment and security has increased in importance relative to fare stability, but it still has an index value of only 7. The apparent preeminence of fare stability is in marked contrast to the public attitudes discussed above. It appears that New York is giving this issue much more attention than is warrented.

Another finding emerges when expenditures for bus and subway systems are considered separately (see Tables III.D.2 and III.D.3). On a per capita basis, total past capital expenditures on subways have been over two and one-half times those for buses. On a per revenue passenger basis, however, expenditures for buses have been slightly above those for subways. In the comfort category, which includes expenditures for new and renovated vehicles, the pattern is different, with twice as much per capita having been spent on buses. The expenditures proposed in the Moynihan-Holtzman Submission continue this pattern--the funding levels, however, are essentially double.

It appears from these data that New York has been favoring its bus system relative to the subway system. This has user group implications, since it was shown earlier that the bus system tends to serve the elderly and middle income groups and women, while the subway serves the poor, racial minorities, and male travelers.

TABLE III.D.2

NORMALIZED EXPENDITURES
(M-H Average Annual)

	Transit			Bus			Total		
	Per Capita	Per Rev. Passenger	Per Rev. Vehicle Mile	Per Capita	Per Rev. Passenger	Per Rev. Vehicle Mile	Per Capita	Per Rev. Passenger	Per Rev. Vehicle Mile
Fare Stability (Govt. Assistance)	not applic.	not applic.	not applic.	not applic.	not applic.	not applic.	$100.60	$0.54	$2.419
Operational Safety and Reliability	$20.65[a]	$0.148[a]	$0.861[a]	$0.00	$0.00	$0.00	$20.65[a]	$0.111[a]	$0.685[a]
Comfort	$ 6.28	$0.045	$0.190	$11.02	$0.238	$1.295	$17.30	$0.093	$0.416
Environment and Security	$ 6.98[b]	$0.050[b]	$0.215[b]	$0.00	$0.00	$0.00	$ 6.98[b]	$0.037[b]	$0.171[b]
Total Capital	$33.91[a,b]	$0.243[a,b]	$1.266[a,b]	$11.02	$0.238	$1.295	$44.93[a,b,c]	$0.241[a,b,c]	$1.276[a,b,c]

[a] Assumes all expenditures under "(TA) other" are for transit, does not include $9.0 million for SIRT or $4.70 million for commuter rail.

[b] Does not include $1.0 million for S.I. ferry.

[c] Does not include operating expenditures for fare stability.

TABLE III,D,3
NORMALIZED EXPENDITURES
(Past Average - 1975 thru 1978)

	Transit			Bus			Total		
	Per Capita	Per Rev. Passenger	Per Rev. Vehicle Mile	Per Capita	Per Rev. Passenger	Per Rev. Vehicle Mile	Per Capita	Per Rev. Passenger	Per Rev. Vehicle Mile
Fare Stability (Govt. Assistance)	not applic.	not applic.	not applic.	not applic.	not applic.	not applic.	\$37.33^{c}	\$0.200^{c}	\$0.898^{c}
Operational Safety and Reliability	\$11.30^{a}	\$0.081^{a}	\$0.342^{a}	\$0.00	\$0.00	\$0.00	\$11.30^{a}	\$0.061^{a}	\$0.272^{a}
Comfort	\$ 3.07	\$0.022	\$0.093	\$6.00	\$0.130	\$0.705	\$ 9.07	\$0.049	\$0.218
Environment and Security	\$ 1.81^{b}	\$0.013^{b}	\$0.055^{b}	\$0.00	\$0.00	\$0.00	\$ 1.81^{b}	\$0.010^{b}	\$0.044^{b}
Total Capital	\$16.18^{a,b}	\$0.116^{a,b}	\$0.490^{a,b}	\$6.00	\$0.130	\$0.705	\$22.18^{a,b}	\$0.120^{a,b}	\$0.534^{a,b}

[a] Assumes all expenditures under "(TA) Other" are for transit, does not include \$8.0 million for S.I.R.T. or \$38 million for commuter rail.

[b] Does not include \$5 million for commuter rail.

[c] Average of 1978 and 1979.

Thus, among the government's apparent transportation priorities, fare stability is clearly dominant. Capital expenditures tend to favor bus riders over subway riders, even though there are almost four times as many subway revenue passengers as bus revenue passengers. It was not possible, however, to rank the bus system and the subway system in terms of the overall quality of the capital plant or the need for capital investment. It might also be noted that the federal government seems more likely to accept a grant application for buses than for rail transit, simply because rail transit expenditures tend to have longer term capital requirements at much higher levels.

IV. EVALUATION OF PUBLIC TRANSPORTATION ACTIONS TO MEET BASIC TRANSPORTATION NEEDS

IV.A Actions Proposed in Moynihan-Holtzman Submission

The Moynihan-Holtzman Submission proposed actions in five categories to address the Basic Transportation Needs. These action are: management improvements, fare stability, rehabilitation of public transit, improvement and promotion of mass transit service, and improving transit support systems. The first action, management improvements, which overlaps the fourth action, addresses issues of improved transit service and aims to improve transit service and reduce operating costs through management changes and reorganization. The actions required, however, are vague and undefined, primarily because they are predicated on a Management Study that had not been completed.

The Fare Stability Action calls simply for maintaining the current fare through 1981 and increasing it gradually thereafter at a rate less than the cost-of-living. This action is stated in a very straight-forward manner.

The actions grouped under the heading of Rehabilitation of the Public Transit System are addressed to the objective of modernization of the transit system. The improvements are physical in nature and address the "needs" of comfort, safety, and operational reliability and security.

The fourth action of improving and promoting mass transportation includes a list of programs aimed at reducing travel time, improving coordination, providing information, and promoting transit service improvments. Several of the actions are in the form of studies whose conclusions are to be implemented.

The fifth action of improving transit support systems addresses improvements in the form of park-and-ride facilities, changes in patterns of travel demand in the form of staggered work hour programs and (again) operational improvements to the transportation system in the form of express bus and car pool lanes.

IV.B Evaluation of the Appropriateness of the Actions

IV.B.1 Evaluation Methodology

The process of evaluating the appropriateness of the proposed actions to meet the criteria presented in the submission is in three phases: 1) compare the proposed actions with those of transit plans in other urban areas; 2) examine the internal consistency of the submission; and 3) analyze possible local views of the proposed actions. Although one would like to compare New York's proposed actions as stated in the submission with those of other urban areas, such a comparision is not possible because adequate data is not available. One cannot make direct comparisons between a fiscally-constrained plan such as the Moynihan-Holtzman Submission and capital programs of other areas which are not typically constrained. One is limited therefore to a comparison of transit programs which are funded, or for which a grant application has been submitted. A comparison of the aggregate value of such projects is presented in Chapter V. Thus, in this chapter, evaluation of the appropriateness of actions is limited to points two and three, above.

IV.B.2 Problems of Consistency in the Moynihan-Holtzman Submission

Two kinds of consistency problems emerge in an examination of the Moynihan-Holtzman Submission. The first involves relationships among the components of the proposal; the second deals with the relationship between this plan and other planning efforts for transportation in New York.

Internal Consistency

Whenever a complex plan such as this is broken into component parts for purposes of analysis or funding, there are bound to be spillover effects across components. Usually this is not a serious problem. Benefits from one component actually accrue to other categories but are not noted. For example, expenditures in the comfort category for renovated subway cars will also improve the overall passenger environment. Similarly, station improvements will also contribute to overall passenger comfort. In both cases, no unidentified costs are involved.

There are cases, however, where such spillover effects will cause additional costs which are not noted. For example, expenditures for air conditioning bus and subway vehicles will cause increased energy demands. The plan for rehabilitating subway tracks and lines partly recognizes this by including new third rail for parts of the network. The energy demands are not, however, reflected in the operating budget allocation for fuel and power. The doubling or tripling of the number of air conditioned vehicles and the rapid rise in the unit cost of energy are not consistent with the proposed expenditures, which show modest increases of 5.5 percent annually through 1983. Thus, capital investment in comfort has serious implications for the operating budget and the objective of fare stability. Other spillovers of costs from one category of improvement to another will result from the plan, and must be taken into account in order to accurately assess the financial implications of each proposed improvement.

Consistency with Other Planning Efforts

A quantitative comparison of the capital program in the Moynihan-Holtzman Submission with other similar programs will appear in Chapter V below. At this point a more subjective issue will be discussed. An examination of the transportation planning documents prepared by the various planning bodies active in the New York area (The City Planning Department, the Tri-State Regional Planning Commission, the Port Authority of New York and New Jersey, and New York State Department of Transportation) suggests that these agencies are among the most innovative and forward-thinking in the nation. These bodies have excellent staffs and do very creative work. Yet the Moynihan-Holtzman Submission, prepared by the New York Department of Transportation and the New York Department of Environmental Conservation, does not reflect this creativity. The plan seems commonplace. Since the New York area is the major metropolis in the nation, and the area's transportation system is the largest in the nation, it does not seem appropriate that the basic objective as presented in the Moynihan-Holtzman Submission is simply to keep its seventy-five year old system in order. That may be a function of the emphasis on "basic" transportation needs, but it results in a plan that is lackluster when compared to those prepared by other planning bodies.

IV.B.3 Local Views of Moynihan-Holtzman Submission Actions

The likely views of New York City residents toward actions proposed in the Moynihan-Holtzman Submission are an important component in the evaluation of the actions. Like Section II.C, on New Yorkers' basic transportation needs, and Section III.C, on their priorities in evaluating performance standards, this section is based on findings of survey research. Unlike the previous sections, however, which concentrated on the objective conditions (Section II.C) and subjective opinions (Section III.C) of people with respect to transportation _in general_, this section will marshall the available survey data on New York City that might inform public views of measures like those contained in the Moynihan-Holtzman Submission _in particular_. The exhibits referred to can be found in Appendix D.

This analysis of the likely view of New Yorkers toward the Moynihan-Holtzman Submission attempts to answer four general questions:

(1) Is there public support for increased government activity--particularly federal activity--to encourage public transportation?

(2) What is the level of public support for stable transit fares?

(3) Would there be increased use of mass transit if fares were held constant, or if various other improvements were implemented?

(4) What priorities does the public assign in the economic trade-off between fare level and transit improvements?

Public Support for Federal Activity in Transportation: The evidence for such support is, by the usual standards of survey research, overwhelming. CHOICE, the Regional Plan Association's exercise in participatory democracy in 1974, revealed that 89 percent of New York City residents taking part favored government policy to encourage more reliance on public transportation in the area. Significantly, this was not a general population survey (the source of all other survey data heretofore presented in this report), but included only people with an active interest in the question--the likely opinion leaders in any community.

Many innocuous questions about apparently worthwhile measures (so-called "motherhood" questions) do not draw much more than 89 percent support in general population surveys. For this reason, the CHOICE experience constitutes strong evidence of widespread public support for government activity to encourage public transportation in the New York City area. This support is strong among precisely those people--the actively interested and opinion leaders--upon which success of the Moynihan-Holtzman proposal is likely to depend.

Public Support for Stable Transit Fares: The CHOICE data also provide a glimpse of the structure of public opinion on fare stability. Four basic positions neatly divide opinion on the question. From these one might infer that, in response to the Moynihan-Holtzman proposals, one-third of the public wants fares to be held constant, another one-third wants fares pegged to the rate of inflation, and the remaining one-third is evenly divided on either side of these two middle positions: one-sixth wants no fares (free public transportation) and one-sixth wants a free-market fare (no government subsidy of public transportation). In other words, moving from the so-called "liberal" to the "conservative" extreme on the question, one-sixth wants free transportation, one-third wants a stable fare (reduced with inflation), one-third wants a fare pegged to inflation (stable in constant dollars), and one-sixth wants a free-market fare, likely to be considerably higher without benefit of government subsidy.

This means that the Moynihan-Holtzman proposal for a constant fare would have roughly 50 percent support against a more conservative measure (constant-dollar stability) and majority (5/6) support against a more liberal measure (free public transportation), at least among those actively interested in transportation and likely to be opinion leaders on the subject. In short, a constant fare comes about as close as any proposal could to representing the happy median of public opinion, which seems to lie roughly equidistant between absolute and constant-dollar stability.

Change in Transit Use with Fare Stability and Improvements: Only about 13 percent of the people who travel to Manhattan by automobile are virtually certain that they would abandon their cars for mass transportation if their criticisms of it were taken care of by government authorities, as shown by Exhibit IV.B.3.3. This suggests that improvements in public transportation are not likely, in themselves, to effect much change in automobile ridership.

Similarly, if public transit fares were cut in half, which is a considerably more drastic change than that of the Moynihan-Holtzman proposal, only 7 percent of those who travel to Manhattan by automobile said they were virtually certain to abandon their cars for public transportation (Exhibit IV.B.3.4). This suggests that the Moynihan-Holtzman program, in itself, is not likely to reduce automobile ridership a great deal. Moreover, ridership is more likely to be reduced because of transit improvements than through stability or reduction of fares.

These findings are supported by other survey data. For example, one study asked automobile drivers and nondrivers if they would make greater use of buses and subways if the fares were decreased (Exhibit IV.B.3.5). Only about one-third using automobiles agreed that they might use public transit more often; among non-drivers, the fraction was about one-half. In other words, the Moynihan-Holtzman fare proposal is more likely to increase ridership of public transit among those who already rely upon it for commuting than it is likely to reduce automobile use in the New York City area.

Exhibit IV.B.3.6 presents similar data broken down by income and geographical areas of the city. As the exhibit shows, lower income groups would be more likely to increase their use of public transit if fares were decreased by one-half (to 25 cents) than would higher income groups. Moreover, those currently commuting in a van or car pool would be much more likely to switch to public transit than would those currently commuting individually by automobile.

There is public support for reduced transit fares if this would mean higher personal taxes. As seen in Exhibit IV.B.3.7, 32 percent of the residents of New York City favor reduction of transit fares by one-half, even if it meant that they would have to pay an additional amount of tax (lower income groups are more willing to pay additional taxes in exchange for lower transit fares than are higher income groups). In other words, a significantly larger percentage of people is willing to support a reduction of transit fares through increased tax payments than through increased ridership of public transportation. This may be because subsidization of transit fares is viewed as a form of social welfare legislation, and supported--even at the cost of additional tax dollars--by those who do not expect to make greater use of the transit system (and hence are really subsidizing others). The pattern may also be due, in part, to the desire to get other commuters off the road and onto mass transit--to reduce highway congestion and to increase the ease of one's own commute (22 percent of automobile users, and 19 percent of nonusers, favor a fare decrease at the expense of their own tax dollars).

Fare Level Versus Transit Improvements: Residents of New York City do not consider reduced fares as necessarily the most important priority for public transportation as shown by Exhibit IV.B.3.3. The improvement with greatest support, among those listed in this survey, is more frequent bus and subway service during the rush hour (87 percent were dissatisfied with this, and 74 percent would be willing to pay an increased fare to correct the problem). Scanning down the list of desired improvements, one might derive the following rough rule of thumb: of the percentage of people complaining about a given transit problems, the percentage of those willing to pay greater fares to correct the problem will be roughly 10 to 12 percentage points less.

However, a sizeable percentages of people support increased fares in exchange for each of a wide variety of public transit improvements. It seems clear that the fare level itself is by no means the single most important public priority for New York City mass transit.

In summary, the likely views of New York City residents toward the major actions proposed in the Moynihan-Holtzman Submission seem clear:

- There is considerable public support in the New York City area for government activity in support of mass transit.
- There is support for either absolute or constant-dollar stability of fares, but this is partially viewed as a social welfare measure by those who do not themselves make much use of mass transit; hence fare stability is not likely to greatly reduce automobile use.
- Transit usage is not particularly sensitive to fare level, and may be only slightly more sensitive to transit improvements; hence the improvements listed in the submission are not likely to greatly increase ridership of mass transportation.
- Various improvements in public transportation, even at the expense of higher fares, are given higher priorities by the public than is fare stability.

V. FUNDING AND THE LIKELIHOOD OF IMPLEMENTATION

V.A. Proposed Funding Levels

Statement of Funding Levels

The Moynihan-Holtzman Submission specifies five categories of basic transportation needs and then proposes expenditures for each. These proposed funding levels are shown in the first two columns of Table V.A.1.[1]. The plan calls for $271 million in government assistance for fare stability in the operating budget. Proposed capital expenditures are:

a) $204 million for operational safety and reliability;

b) $214 million for comfort; and

c) $51 million for environment and security.

Proposed capital expenditures total $379 million.

Note that the plan calls for no capital expenditures in the service availability and convenience category. In fact, the plan suggests route and scheduling modifications, but this seems to be costless--at least in terms of capital needs. The operating costs of these changes are not specified. Also, the station improvements included under the Comfort and Security category include such things as elevators which increase system availability, particularly to the elderly and handicapped.

Adequacy of Funding Levels for Each Basic Transportation Need

Assessing the adequacy of the funding levels proposed in the Moynihan-Holtzman Submission is difficult on several counts. First, the standards in judge whether they will be met. Second, there is no project by project breakdown so it is impossible to determine whether proposed funding will allow the implementation of projects included. Finally, there is inadequate information for determining whether the projects, if implemented, will actually change the characteristics of the system. For instance, will the investments in the Operational Safety and Reliability category actually change the on-time experience of the subway system? That question cannot be answered on the basis of available data.

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[1] Note that proposed expenditures for new or rehabilitated vehicles are included in the Comfort category rather than the Operational Safety and Reliability.

Given the dearth of information, the only way to attempt an evaluation of proposed funding levels is to compare them with capital programs for transportation prepared by other planning bodies in the region. Table V.A.1 includes proposed capital investments from a variety of sources. The first is the State Implementation Plan (SIP) which was also included in the Moynihan-Holtzman Submission. The second is "A New Direction in Transit," prepared by the New York City Planning department. This is followed by capital proposals included in the 1980 New York City Executive Budget. Fourth is the proposal of expenditures included in the MTA's application to the Urban Mass Transportation Administration (UMTA) which consists of three parts: a) the basic UMTA application; b) the Accelerated Transit Program (ATP); and c) the proposal for the Joint Development Program (JDP). Finally, capital expenditures proposed in "Capital Needs and Priorities for the City of New York" prepared by the New York City Planning Commission are included.

A difficulty underlying this comparison must be stated at the outset. Since all of these capital programs were prepared by New York agencies, they are not strictly independent of each other. Indeed, the Moynihan-Holtzman Submission was prepared by the same agency which prepared the SIP. Also, the UMTA applications were prepared to be consistent with the Moynihan-Holtzman

TABLE V.A.1

SUMMARY OF PROPOSED 1980 EXPENDITURES TO MEET BASIC TRANSPORTATION NEEDS - SEVERAL SOURCES

(in $ millions of current year dollars)

	M-H Submission Table I Operating Expenditures	M-H Submission Table III-1 Capital Expenditures	S.I.P. from Table III-1	A New Direction in Transit, A-C Levels D.C.P.	1980 Executive Budget, N.Y.C. Capital Budget	1980 UMTA Applications by MTA[a]	Capital Needs and Priorities C.P.C.
1. Fare Stability	Government Assistance 721[c]	-----	Government Assistance 837	-----	City Payments from Expense Budget 287.5	-----	
2. Operational Safety and Reliability	-----	283 - 79 buses[b] 204	287 - 83 buses[b] 204	229.7	340.6	UMTA 136.1 ATP 62.0 198.1	272.4
3. Comfort (crowding, air conditioning, noise	-----	45 + 79 buses[b] 124[d]	51 + 83 buses[b] 134[d]	205.6[e]	201.2[f]	UMTA 83.2 ATP 41.0 124.2[g]	242.8
4. Environment and Security	-----	51	76	111.5	147.253	UMTA 25.0 ATP 55.0 JOP 40.0 120.0	130.4
5. Service Availability and Convenience	-----	-----	N.A.	Para Transit 0.05	146.99	-----	111.5[i]
TOTAL	721[c]	399	414	546.85	836.043[h]	442.3	759.1

a. Includes the sum of 1980 Expenditures in the second year basic application (UMTA) plus expenditures in the Accelerated Transit Program (ATP), plus expenditures in the New Initiative Joint Development Program (JDP).

b. Expenditures for new buses could go either in Operational Safety and Reliability or in Comfort. To facilitate comparisons, I have chosen the latter.

c. As indicated in the detailed review of the proposed operating budgets, there may be deficits ranging as high as $250 million for the NYCTA and $80 million for commuter rail activities in addition to government assistance.

d. Does not include expenditures on new transit cars, but does include $20 million for air conditioning retrofit.

e. Includes $185.6 million for new and rehabilitated transit cars.

f. Includes $47.4 million in transit car modernization.

g. Includes $36.2 million for air conditioning transit cars.

h. Does not include the $207.5 million from the expense budget.

i. Completion of Queens expansion work already under way.

Submission. In spite of this difficulty, the comparisons are still useful. As is clear from Table V.A.1., the funding levels proposed for meeting basic transportation needs are the lowest in all categories. A more detailed examination of each category follows.

Fare Stability: Fare Stability is actually a function of the operating budget rather than of capital expenditures. This section examines some specific points concerning the impact of fare stability and other policies on transit operating budgets. Appendix A presents an item-by-item examination of the operating budget presented in Tables V-3 and V-4 of the Moynihan-Holtzman Submission (for NYCTA and Computer Rail Operations, respectively). Note that these operating budgets are for implementing the S.I.P. No operating budgets explicitly for the Basic Transportation Needs Program are provided in the Moynihan-Holtzman Submission.

Table 1 of the Moynihan-Holtzman Submission indicates average annual levels of government assistance to satisfy basic transportation needs of $721 million. Assistance of $837 million is needed to satisfy needs outlined in the SIP. The only difference between basic needs relative to fare stability and fare stability as per the SIP, is that the latter retains the fifty cent fare through 1981 while the former allows fares to keep pace with the cost of living. This suggests that retention of the fifty cent fare costs about $100 million per year.

Additional points rely on the analysis in Appendix A. It must be noted here that the operating budget figures are presented through 1983, always in current dollars. No adjustments are made for inflation. On the revenue side, the forecasts for the NYCTA seem unduly optimistic, particularly estimates of farebox revenue and government assistance. Making some modest assumptions about ridership and about the various forms of government assistance produces forecasts $87 million below those in the Moynihan-Holtzman Submission. At the same time, revenue forecasts for commuter rail activities seem somewhat conservative.

In addition to the possible overstatement of revenue, it appears as if expenditures are underestimated. Table V.A.2, drawn from Appendix A, indicates the range of understatement in expenditures in 1983 for inflation rates of 8 percent and 12 percent. The total shortfall runs from $71 million to $234 million, clearly substantial amounts. When these figures are combined with the possible $87 million overestimate in revenues, it appears that the operating deficit may be understated by $158 million to $371 million, depending on the rate of inflation.

This review suggests that the objective of fare stability, the objective apparently seen as the most important aspect of basic transportation needs, cannot be met without substantial additional assistance funds. Without these funds, fare stability is in serious jeopardy.

Operational Safety and Reliability: Expenditures in this category include such things as right-of-way rehabilitation, renovation of signal and communication systems, upgrading power systems, and upgrading of maintenance and service facilities. Some of this work is necessary to serve air conditioned subway cars.

Table V.A.3 shows a breakdown of expenditures in this category for various capital programs. The figures, except for the executive capital budget and the UMTA applications, are average annual expenditures throughout the planning period. Comparing the bottom line figures is misleading because the Moynihan-Holtzman figures and the S.I.P. figures include $47 million for commuter rail activities while others include no similar allocation.

It is difficult to examine the breakdown of expenditures in this category

TABLE V.A.2

UNDERSTATEMENT IN FORECASTS OF 1983 OPERATING EXPENDITURES FOR NYCTA
(in $ millions)

	8% Inflation	12% Inflation
Wages/Salaries and Fringes	37	173
Fuel and Power	11	30
Other	---	---
TOTAL	48	203

UNDERSTATEMENT IN FORECASTS OF OPERATING EXPENDITURES FOR COMMUTER RAIL ACTIVITIES, 1983
(in $ millions)

	8% Inflation	12% Inflation
Wages/Salaries and Fringes	19	66
Fuel, Power and Utilities	0	6
✓ Other	4	9
TOTAL	23	81

TOTAL UNDERSTATEMENT IN FORECASTED OPERATING REVENUES, 1983
(in $ millions)

TOTAL	71	294

TABLE V.A.3

DETAILED BREAKDOWN OF PROPOSED EXPENDITURES ON OPERATIONAL SAFETY AND RELIABILITY (in $ millions)

	M-H	SIP	DCP	Exec. Budget	UMTA	CPC
Right-of-Way Rehabilitation	---[a]	---[a]	73.0	190.5	61.0	86.3
Signals and Communications	---[a]	---[a]	50.5	57.4	43.0	59.6
Power Equipment	---[a]	---[a]	32.0	42.4	18.0	37.8
Shops and Yards	---[a]	---[a]	36.0	50.2	41.5	42.5
S.I.R.T (including Ferry)	9.0	9.0	4.2	---	---	6.1
Surface Maintenance and Facilities	---[a]	---[a]	30.0	---	16.4	35.4
Service Vehicles	---[a]	---[a]	4.0	---	6.5	4.7
Other	148.0[a]	148.0[a]	---	---	11.7	
TOTAL	204[b]	204[b]	229.7	340.6	198.1	272.4

a. Impossible to disaggregate. Includes $148 million for (TA) Other.

b. Includes $47 million for Commuter Rail System.

because the Moynihan-Holtzman Submission and the S.I.P. lump most expenditures into an "other" subcategory. However, with the exception of the proposed expenditures for right-of-way rehabilitation in the executive capital budget, there is a remarkable degree of consistency among the other four sets of proposed expenditures. If one takes the average of the entries in each row of the table in the last four columns, and imputes that value as the cost of basic needs in each category,[1] it is possible to impute total costs. Note that these are essential systems for which it is difficult to conceive a difference between basic needs and any other level. At any rate, the imputed cost of these improvements is slightly over $228 million, a figure substantially greater than that in both the Moynihan-Holtzman Submission and the SIP. This suggests that $148 million is a low level of funding for capital investment needs in that category of Operational Safety and Reliability.

Comfort: Expenditures in this category are primarily aimed at air conditioning transit vehicles (both buses and subway cars). Substantially smaller amounts of money are allocated to abatement of noise and crowding. Note that comfort in stations is included in the category "Environment and Security" below. Note also that improved signal systems may increase capacity and reduce crowding, and that right-of-way rehabilitation will reduce noise.

Table V.A.4 shows the breakdown of proposed expenditures for the various capital programs. As could be expected, the basic needs proposal is consistent with the SIP and both are reflected in the UMTA applications. Also, with the exception of the executive capital budget, there is remarkable uniformity in the necessary expenditures for new (air conditioned) buses.

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[1] The executive budget figure for right-of-way rehabilitation was omitted as being unrealistic.

TABLE V.A.4

DETAILED BREAKDOWN OF PLANNED EXPENDITURES ON COMFORT
(in $ millions)

	M-H	S.I.P.	D.C.P.	Exec. Budget	UMTA	C.P.C.
Air Condition Subway Cars	20.0	20.0	18.0	49.4	36.2	---[a]
Air Condition Buses	---	---	2.0	---	---	---[a]
New Subway Cars	---	---	119.0	---	---	161.7[a]
New Buses	79.0	83.0	66.6	153.2	88.0	81.1[a]
Platform Lengthening	18.0	18.0	---	0.6	---	---
Noise Control	7.0	13.0	---	---	---	---
TOTAL	124.0	134.0	205.6	201.2	124.2	242.8

a. Includes both purchase and rehabilitation.

The major discrepancy in this set of proposed expenditures revolves around the purchase or rehabilitation of subway cars. The executive budget proposes $47.4 million for rehabilitation. The City Planning Commission proposes $161.7 million for new cars and the Department of City Planning proposes a total of $136 million for new and renovated cars. The Moynihan-Holtzman Submission and the SIP propose $20 million for retrofitting (air conditioning) subway cars and state that they are studying options for expanding the subway car fleet and replacing cars as they retire. No funding source for this work is explicitly included. Thus, it is clear that the funding level proposed for comfort by the Moynihan-Holtzman Submission (which is reflected in the UMTA application) is inadequate to satisfy basic transportation needs.

Environment and Security: Expenditures in this category (see Table V.A.5) deal primarily with station improvements which include appearance, convenience, access for the elderly and handicapped, security, and comfort (comfort in vehicles is in the previous section). It is, however, impossible to disaggregate the expenditures according to these components. In recent months, an increase in subway crime has led to an expansion of police protection in the subway. While such additional protection is likely to be a continuing basic need, there is no discussion in the Submission of the expected impact of expanded police protection on operating expenses.

Expenditures for station improvements in the Moynihan-Holtzman Submission are substantially below those in other capital programs. Indeed, the fact that the UMTA proposals include an amount consistent with the SIP in the basic and accelerated transit program proposals alone, and have added $40 million in the Joint Development Program, suggests that the SIP proposal may be a better measure of basic needs than the Moynihan-Holtzman Submission.

TABLE V.A.5

DETAILED BREAKDOWN OF PROPOSED EXPENDITURES ON ENVIRONMENT AND SECURITY (in $ millions)

	M-H	S.I.P.	D.C.P.	Exec. Budget	UMTA	C.P.C.
Station Improvements	49.0[a]	74.0[a]	102.5	147.3	120.0	121.0
Station Improvements (SIRT)	1.0	1.0	8.0	---	---	9.4
Staten Island Ferry	1.0	1.0	1.0	---	---	---
TOTAL	51.0	76.0	111.5	147.3	120.0	130.4

a. Includes $5 million for Commuter Rail Activities.

The JDP brings the total up to a level necessary to satisfy priorities A through C of the DCP proposal.

Service Availability and Convenience: Since the basic emphasis of the Moynihan-Holtzman Submission, the SIP, and the UMTA proposal is on the upgrading of the existing system, there is no mention of funding for expanded service. The Moynihan-Holtzman Submission mentions future studies of scheduling and/or bus route modifications to improve service availability, but this will presumably not require capital funds. The DCP proposal calls for a small amount to be spent on city-wide paratransit, primarily to aid the elderly and handicapped. The City's Executive Capital Budget includes a substantial expenditure for extension of transit lines (primarily the Second Avenue line) as part of its new routes program. This seems inconsistent with basic needs, but may well be desirable. It should also be noted that the CPC program includes $115.5 million in new routes for the Queens extension, work which is currently in progress. It appears as if the existing capital plant (after rehabilitation) is sufficient to satisfy basic needs regarding service availability and convenience. The only possible exception is service to the elderly and handicapped, which may be provided by new buses built to new federal specifications, and by the addition of elevators in the station improvement proposals.

In summary, a clear pattern seems evident. The Moynihan-Holtzman Submission seems to understate the levels of investment needed to satisfy basic transportation needs. In every category the proposed annual expenditures seem low. While this may suggest that the SIP goes beyond basic transportation needs, it appears that even the levels of funding proposed in the SIP are actually inadequate. One is left to conclude that the MTA, through its UMTA capital funding application is attempting to satisfy basic needs, but that the Moynihan-Holtzman Submission seriously understates the level of expenditures necessary.

It should be noted that the level of expenditures proposed in the Moynihan-Holtzman Submission represents a virtual 100 percent increase over past funding levels, even when viewed on a per capita or per revenue passenger basis. This may suggest that the system has been seriously underfunded in the past, a factor contributing to the high levels needed now.

V.B. Comparative Budgets and Fare Analysis

This section provides a comparison of fare, operating budget, and subsidy, and capital expenditures in New York City, against other metropolitan areas within and outside of New York State.

Fare Analysis

The operating budget is closely linked with the fare stability question. The Moynihan-Holtzman Submission considers fare stability an essential component of basic transportation needs. A consideration of aspects of fare policy among basic transportation needs is certainly in order. The question then is whether fare stability is the proper criterion of basic needs. The state seems to choose that definition and has taken a policy position that fare stability is the need on which financial commitment will be focused. This would necessarily have serious impact on the amount of money available for other operating expenditures or capital improvement projects. For that reason alone, fare as policy should be the subject of further scrutiny. There are, however, two additional considerations discussed in previous chapters which emphasize the need for analysis of fare policy. The first point is that ridership is not very closely tied or sensitive to changes in fare. There is certainly a consensus regarding that conclusion and it has been echoed by the public as well as the professionals in the transportation field. The second consideration, also alluded to before, is that of equity. The policy could have been that fare should be equitable among modes, income groups, or cities in the New York State. Faced with the question of equity vis-a-vis stability, the State has selected the position of fare stability. Further examination of that position, however, using several measures of equity, should enable us to determine whether the fare would remain stable. If it does not, a change in fare will directly impact the amount of money or funds available for capital expenditures.

Tables V.B.1 through V.B.4 summarize an analysis conducted by the Planning Research Unit of the New York State Department of Transportation on Equity in New York State Transit Fares (Weiss, et. al., 1975). Table V.B.1 shows that transit riders in the ten different communities included in this analysis bear differing portions of the cost of their respective systems. The first column shows the fraction (percent) of the operating cost made up by the fare box. The percentage ranges from a low of 44.1% to a high of 73.4%, both of which occur in the New York MTA system. The second and third columns are the base and average fare paid by each rider. The last column shows the results of equalizing the fare, i.e., changing fares in some places so that transit riders bear an equal share of their respective system operating costs. Equalizing on the average operating ratio of 56.9%, New York City bus fares would be lower while commuter rail fares would be higher than at the present time. Thus, "A policy of equal share cost paid for by riders would lead to lower fares on New York City transit systems relative to commuter rail."[1]

Table V.B.2 summarizes the average fare per travel mile for ten different operators in New York State. In considering the distance traveled, the

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[1] Equity in New York Transit Fare, p. 4

TABLE V.B.1

FARE EQUITY ANALYSIS
TRANSIT SYSTEM REVENUES AS A PERCENT OF COSTS

System	SFY 1977 % Cost met by Fares	Present Fares Base	Present Fares Average	Equalized Fares Equalized to Average Ratio*
MTA - Bus	73.4	50¢	42¢	33¢
- Subway	54.0	50¢	46¢	48¢
- Commuter Rail	44.1	$1.76	$1.89	$2.44
NYC Private	74.8	45¢**	42¢	32¢
Nassau County	44.2	45¢	45¢	58¢
Westchester County	63.8	38¢**	38¢	34¢
NFTA (Buffalo)	65.8	40¢	43¢	37¢
RGRTA (Rochester)	55.6	40¢	41¢	42¢
CDTA (Albany-Sch'dy-Troy)	64.7	40¢	47¢	41¢
CNYRTA (Syracuse)	56.5	35¢	36¢	36¢
Utica TA	49.1	35¢	24¢	28¢
Broome Co.	66.7	40¢	39¢	33¢
Average Ratio	56.9			

* Adjusted to average ratio (56.9%), average fare used; no shrinkage

** Average of systems

TABLE V.B.2

FARE EQUITY ANALYSIS

AVERAGE PRICE PER MILE TRAVELED

System	Average Trip Length (M)	Present Fares		Fare Per Mile		Equalized Fares to Average Ratio
		Base	Average	Base	Average	
MTA - Bus	2.0	50¢	42	25.0	21.0	23¢
- Subway	7.2	50¢	46	6.9	6.4	84¢
- Commuter Rail	26.0	$1.76	$1.89	6.8	7.3	$3.03
NYC Private	--	45¢	42¢	12.9	12.0	41¢
Nassau County	3.5	45¢	45¢	12.9	12.9	41¢
Westchester County	2.5	38¢	38¢	15.2	15.2	29¢
NFTA (Buffalo)	3.2	40¢	43¢	12.5	13.4	36¢
RGRTA (Rochester)	3.5	40¢	41¢	11.4	11.7	41¢
CDTA (Albany-Sch'dy-Troy)	2.5	40¢	47¢	16.0	18.8	33¢
CNYRTA (Syracuse)	3.5	35¢	36¢	10.0	10.3	41¢
Utica TA	3.2	35¢	24¢	10.9	7.5	37¢
Broome Co.	3.0*	40¢	39¢	13.3	13.0	35¢
Average Ratio					11.7	

* Approximated

inequities of the flat fare system become apparent. Although fares throughout the state appear to be the same, the cost per mile to the rider varies from a low of 6.4¢ per mile to a high of 21.0¢ per mile both of which occur, not surprisingly, within the MTA. Therefore

> If fare is to be equalized on a price-per-mile basis--i.e. all transit riders would pay the same price per mile, fares would be considerably higher on the subway and commuter rail and lower on buses in New York than at present.[2]

Table V.B.3 shows the relationship between fare and mean income for the same communities listed in the previous two tables: the New York Transit rider pays a lower percentage of his income for commuting than any other rider in the state. A difference between New York City transit riders and the State average would have increased substantially (up to 50%) if New York City ridership were taken out of the average. Thus, to equalize the commuter fare in other parts of the state, transit fare in New York City should be increased substantially.

Table V.B.4 summarizes the three previous tables and indicates the amount of fare increases or decreases which should be made based on each of the three measures. On the basis of at least two of the three measures, the fare for the subway and commuter rail of the MTA should be increased. Only one measure--income--suggests an increase in bus fare. The fare/operating cost ratio is an equity measure from the operator's point of view. Of the two other measures, the cost per mile is the most appealing. The last measure clearly supports an increase in the subway and commuter rail fare.

Fare stabilization therefore, may not be the only measure of the fare criterion.

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[2] Equity in New York Transit Fares, p. 7.

TABLE V.B.3

FARE EQUITY ANALYSIS

PERCENT OF INCOME SPENT ON PUBLIC TRANSIT COMMUTING

System	1970 Income			Present Fare		% Income Spent on Commuting***		Equalized Fares
	All Workers $	Workers Using Public Tr. $	% Diff.	Base	Average	Base	Average	To Average Ratio
MTA - Bus	7,329	6,212	-15.2	50¢	42¢	4.0	3.4	55¢
- Subway	7,329	6,920	- 5.6	50¢	46¢	3.6	3.3	63¢
- Commuter Rail	17,362*	17,018	- 2.0	$1.76	$1.89	5.2	5.6	$1.53
NYC Private	7,329	6,212	-15.2	45¢**	42¢**	3.6	3.4	56¢
Nassau County	-	-	-	45¢**	45¢**	-	-	-
Westchester County	-	-	-	38¢**	38¢**	-	-	-
NFTA (Buffalo)		4,202	-39.9	40¢	43¢	4.8	5.1	38¢
RGRTA (Rochester)	6,996	4,688	-38.6	40¢	41¢	4.3	4.4	42¢
CDTA (Albany-Sch'dy-Troy)	7,644	4,552	-35.2	40¢	47¢	4.4	5.2	41¢
CNYRTA (Syracuse)	7,020	3,958	-42.6	35¢	36¢	4.4	4.5	36¢
Binghamton	6,666	3,843	-42.3	40¢	39¢	5.2	5.1	35¢
UTA (Utica-Rome)	6,420	3,858	-39.9	32¢	-	4.1	-	35¢
Average Ratio							4.5	

* Metro area workers living outside central city, working inside central city CBD

** Average of systems

*** % income = (Fare) (2) (250 days/yr/mean income)

TABLE V.B.4

FARE EQUITY ANALYSIS

SUMMARY - EQUITY OF TRANSIT FARES

	Base Data			Present Base Fare	Equity Fares Equalized on the Basis of:					
					Cost per Ride		Cost per Mile		% of Income for commuting	
System	% Cost from Fares	% Income Spent on Commuting	Price per Mile Traveled ¢		Fare	Chg.	Fare	Chg.	Fare	Chg.
MTA - Bus	73.4	4.0	25.0	50¢	33¢	-17¢	23¢	-27¢	55¢	+ 5¢
- Subway	54.0	3.6	6.9	50¢	48¢	- 2¢	84¢	+34¢	63¢	+13¢
- Commuter Rail	44.1	5.2	6.8	$1.76	$2.44	+68¢	$3.03	+$1.27	$1.27	-23¢
NYC Private	74.8	-	12.9	45¢	32¢	-13¢	41¢	- 4¢	45¢	0¢
Nassau County	44.2	-	12.9	45¢	58¢	+13¢	41¢	- 4¢	-	-
Westchester County	63.8	-	15.2	38¢	34¢	- 4¢	29¢	- 9¢	-	-
NFTA (Buffalo)	65.8	4.8	12.5	40¢	37¢	- 3¢	36¢	- 4¢	38¢	- 2¢
RGRTA (Rochester)	55.6	4.3	11.4	40¢	42¢	+ 2¢	41¢	+ 1¢	42¢	+ 2¢
CDTA (Albany-Sch'dy-Troy)	64.7	4.4	16.0	40¢	41¢	+ 1¢	33¢	- 7¢	41¢	+ 1¢
CNYRTA (Syracuse)	56.5	4.4	10.0	35¢	36¢	+ 1¢	41¢	+ 6¢	36¢	+ 1¢
Binghamton	66.7	5.2	13.3	40¢	-	-	-	-	35¢	- 5¢
UTA (Utica)	49.1	4.1	10.9	35¢	28¢	- 7¢	27¢	+ 2¢	35¢	0¢

Other measures provide different perspectives and may result in solutions other than stabilizing the fare.

Operating Budget and Subsidy

Table V.B.5 shows a comparison of operating subsidy to New York City and the three other metropolitan areas with the most extensive transit systems in the country--Boston, Philadelphia and Chicago. For purposes of comparison, the subsidies have been normalized over three different variables: per revenue passenger, per vehicle mile, and per capita. Furthermore, subsidies have been broken down into their sources: Federal, State and local. This breakdown, however, is sometimes misleading because Federal funds occasionally are channeled into other agencies which, in turn, allocate them along with other funds to the operators. The operator (Chicago Transit Authority), however, may report these funds as local subsidy. In either case, normalized total subsidy, regardless of its source, is most appropriate for comparison.

Regardless of the normalizing procedure, New York City's operating subsidy does not appear to be out of line with those provided for other major cities. Subsidy per revenue passenger averaged over recent years (75-76 or 75-78) is slightly lower than that of Philadelphia, or Chicago--a reflection of the high ridership in New York City. The per vehicle mile subsidy is between those of Chicago and Philadelphia, but considerably lower than Boston's. The per capita subsidy in New York is comparable only to Boston's but considerably higher than in Philadelphia and Chicago. The Moynihan-Holtzman Submission proposed 1980 subsidy of New York City is noteworthy. Compared with subsidy of recent years, it is expected to increase by almost one hundred percent. The M-H Submission does not explain the reason for the increase, nor does it explain fully the sources of funds required to cover it. There are many unsubstantiated assumptions in the M-H Submission's operating assistance projections. The Section 5

TABLE V.B.5

COMPARISON OF AVERAGE OPERATING SUBSIDIES

	$ per Revenue Passenger				$ per Vehicle Mile				$ per Capita			
	Fed.	State	Local	Total	Fed.	State	Local	Total	Fed.	State	Local	Total
BOSTON 75-76	--	--	--	--	0.33	0.48	2.02	3.63	5.09	7.50	31.79	56.84
PHILADELPHIA 75-79	0.08	0.17	0.10	0.37	0.33	0.63	0.35	1.32	8.97	17.45	9.75	36.34
CHICAGO 75-76	0.00	0.055	0.267	0.322	0.00	0.149	0.719	0.869	0.00	5.125	24.7	29.825
NEW YORK 75-76	0.029	0.056	0.208	0.293	0.112	0.218	0.812	1.142	5.475	10.615	39.41	55.51
75-78				0.25				1.38				55.5
NEW YORK '80				0.54				3.04				100.6

operating assistance authorizations go only through 1982. The projections of these funds through 1982 include about the same total amount of dollars as New York City's share of the authorizations. Note that authorizations are not appropriations. The Moynihan-Holtzman Submission shows a shift of funds from 1979 into the later years and then projects the trend from 1980 to 1982 into 1983 after the shift has been made. This shows quite a different trend than straight authorizations or appropriations. Implicit is the assumption that Federal Operating Assistance will continue, which is probably a reasonable assumption. However, the trend used to project available funds probably results in an over-estimate of 1983 Section 5 Operating Assistance.

Capital Expenditures

Figure V.B.1 and Table V.B.6 show approved transit capital grants to eight major urban areas. The left hand side bar chart shows the cumulative approved capital grants while the right hand chart shows the corresponding figures per capita. Excluding Washington D.C., which received special Congressional appropriations, the New York area received the highest amount of cumulative capital grants. However, when compared on the per capita basis, New York's advantage is reduced considerably but remains higher than that of either Chicago or Philadelphia.

Table V.B.7 compares the capital expenditures of recent years. As was done with the operating subsidy, capital expenditures were normalized on the basis of revenue passenger vehicle miles per capita. Again, New York's expenditures do not differ significantly from those of the three other cities with major transit systems. However, regardless of how expenditures were normalized, New York exceeds both Philadelphia and Chicago. Boston, however, exceeds New York expenditures on the per vehicle mile. The M-H Submission proposed 1980 expenditures are again noteworthy. On all three bases (revenue passenger, vehicle miles, and

TABLE V.B.6

CUMULATIVE APPROVED CAPITAL GRANTS
8 HIGHEST RECIPIENTS
AS OF SEPTEMBER 30, 1977
(Federal Share Only)

Urbanized Area	Section 3	Section 5 Capital	Interstate Transfer	Urban Systems & Other	GRAND TOTAL	Population (from Fed. Reg. 1/13/75)	Grant per Capita
Washington	$ 121,266,902	-	$727,109,516	$ 1,200,400,000 (1)	$2,048,776,418	2,481,489	$826
New York-New Jersey-Connecticut	1,794,791,054	-	-	93,805,050	1,888,596,104	16,206,841	116
Boston	485,662,449	-	272,784,422	-	758,446,891	2,652,575	286
Chicago	714,912,917	$ 300,000	-	6,271,839	721,484,756	6,714,578	107
Atlanta	744,401,464	-	-	-	744,401,464	1,172,778	635
San Francisco-Oakland	552,126,022	2,064,888	-	3,714,650	557,905,560	2,987,850	187
Baltimore	393,048,301	-	221,355	-	393,269,655	1,579,781	249
Philadelphia	304,273,761 (2)	-	62,184,588	-	366 458,349	4,021,066	91
				TOTAL -	$7,479,337,197 (3)	37,816,958	($198)

(1) Congressional Grant for Washington Metro

(2) Includes $25 Million for Center City Commuter Connection

(3) Total Represents 79% of All Funding Commitments (UMTA plus Congressional Grant)

Source: Untitled UMTA Report & WMATA Personnel

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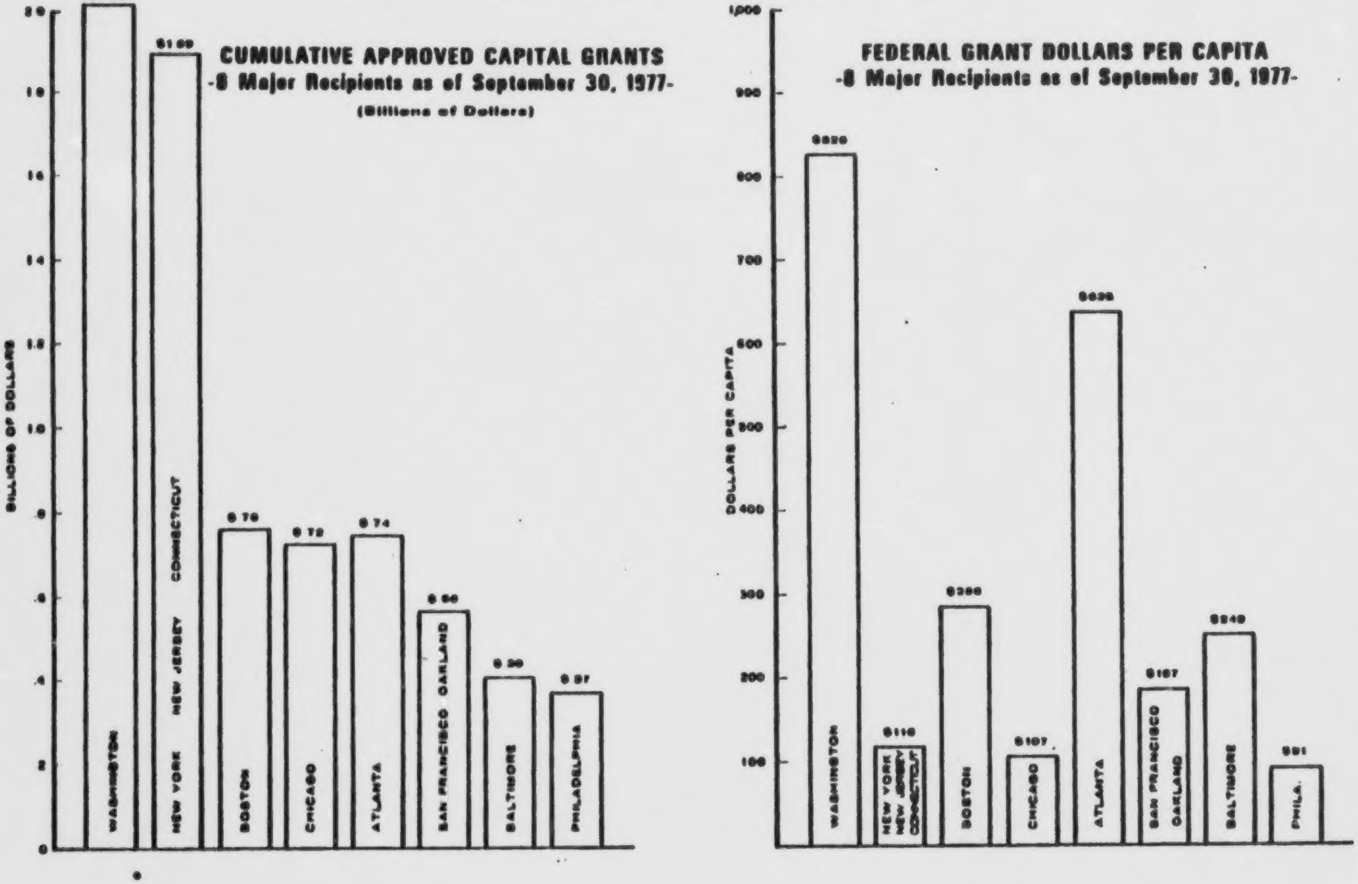
best available copy.

FIGURE V.B.1

(Source: UMTA)

TRANSIT CAPITAL GRANTS TO URBAN AREAS



CUMULATIVE APPROVED CAPITAL GRANTS
-8 Major Recipients as of September 30, 1977-
(Billions of Dollars)

FEDERAL GRANT DOLLARS PER CAPITA
-8 Major Recipients as of September 30, 1977-

TABLE V.B.7

COMPARISON OF AVERAGE CAPITAL EXPENDITURES

	$ per Revenue Passenger				$ per Vehicle Mile				$ per Capita			
	Fed.	State	Local	Total	Fed.	State	Local	Total	Fed.	State	Local	Total
BOSTON 75-76	--	--	--	--	1.37	0.34		1.71	21.87	5.47		27.34
PHILADELPHIA 75-79	.06	.011	.008	.08	.22	.04	.03	.28	6.51	1.10	.82	8.49
CHICAGO 75-76	0.110	0.034	0.000	0.144	0.296	0.091	0.00	0.387	10.163	3.113	0.00	13.3
NEW YORK 75-76	0.171	0.041	0.079	0.224	0.668	0.158	0.049	0.874	32.43	7.69	2.37	42.53
75-78				0.16				0.89				30.4
NEW YORK '80				0.30				1.60				52.9

per capita), the proposed expenditures rate of recent years in New York City (1975-1978) by almost one hundred percent.

V.C. Security of Proposed Funding Sources

After reviewing the way in which the expenditures proposed for New York compare with those in other metropolitan areas, the final step in the analysis is to examine the security of the sources for the proposed funding program. While sources for proposed funding levels will be examined here, it should be remembered that Section V.A. indicated that the proposed funding levels seemed inadequate to meet basic transportation needs.

Government Operating Assistance Funds

Funding for government operating assistance, which directly impinges on the fare stability objective, is composed of Federal, State and local contributions. With one exception, the State and local contributions seem quite secure; the exception is the transfer from the Triborough Bridge and Tunnel Authority (TBTA). As indicated in Appendix A, the TBTA is required to transfer surplus revenues to the MTA. The rate of growth of this revenue transfer seems reasonable, but no mention is made of the possibility of the TBTA undertaking new ventures (such as the Convention Center) which would place a competing demand on surplus revenues. Thus, there is no guarantee that surplus TBTA revenues will continue to be available.

The least secure element in the proposed funding for government operating assistance is the Federal contribution which comes from Section 5 of UMTA. As indicated in Appendix A, the methods used to forecast Section 5 funds include some questionable assumptions, and the trend used for forecasting is based on a shift of funds from 1979 to later years. This results in overly optimistic forecasts of Section 5 funds.

In summary it seems unlikely that the level of funding proposed for government operating assistance will materialize. This conclusion is independent of the parallel finding that the need for operating assistance is understated. This suggests that fare stability may have to be reconsidered as a high priority basic transportation need, particularly in light of the findings on public opinion discussed in section IV.B. 4. above.

Capital Assistance Funds

In the following discussion it should be recalled that Section V.A. above indicated that the levels of capital investment proposed in the Moynihan-Holtzman Submission to meet basic needs (and to some extent to satisfy the SIP) were inadequate. Nonetheless, that plan is being followed quite consistently in the UMTA applications. Since UMTA (along with the required local match) is the primary source of funds for capital investment, it is appropriate to review the security of these funding estimates.

Capital fund requests to UMTA from the MTA consist of three components: the basic UMTA application, the accelerated transit program, and the joint development program. The first of these, the basic UMTA application, is based on the premise that the MTA will continue to get the share of UMTA allocations it has received in the past. This is a reasonable assumption and this component of capital funding is quite secure.

The second component, the accelerated transit program (ATP), is a plan worked out by the governor of New York and the Mayor of New York City. The plan calls for a speed-up in capital investment in transportation and is based on the argument that the MTA should get a substantially larger portion of UMTA allocations than it has in the past. If both the basic program and the ATP are fully funded by UMTA, the funding level will fall between that proposed for basic needs and that proposed in the SIP. The accelerated transit program, however, is not formally recognized by UMTA. It seems questionable to build a capital plan on the assumption that such a program will be fully funded.

The final component of UMTA fundings is the joint development program (JDP) which draws from a separate UMTA appropriation. While there is a reasonable chance that this application will be approved, the funds will be designated explicitly for station improvements other than those indicated as necessary to satisfy basic transportation needs.

It can only be concluded that the sources of capital funds included in the Moynihan-Holtzman Submission cannot be considered secure until and unless there is a guarantee of full funding of the accelerated transit program by UMTA. Even if this occurs, the funding levels appear inadequate to truly satisfy basic transportation needs.

The Moynihan-Holtzman Amendment clearly specifies that a transportation plan consider all possible funding sources. The submission prepared by New York State relies on maintained levels of state and local funding and increased UMTA funding. Capital funds from possible "Interstate Trade-in" were discussed and dismissed as unnecessary. Capital bond issues were not explicitly mentioned although one is currently pending. No mention was made of alternative funding sources such as tax schemes which could be used for mass transit. It would appear that the Submission has not fully drawn on all available funding sources and does not achieve the goal of being able to satisfy basic transportation needs.

VI. CONCLUSIONS

The Moynihan-Holtzman Amendment of the 1977 Clean Air Act charges the State of New York with the responsibility to develop and implement a transit improvement program to meet the "basic transportation needs" of the New York City Metropolitan area. The objective of this improvement program, as interpreted by the U.S. EPA, is to make public transportation a viable alternative to use of the private automobile for all potential users (Costle, 1978).

This study evaluates the Moynihan-Holtzman Submission from various viewpoints - philosophical, technical, and sociological. The major conclusions of this study are given below:

- "Basic transportation needs" refer to the mobility of people, and the movement of vehicles; however, all of the proposed performance measures (with the exception of fare stability) are system-oriented rather than user-oriented (Section III.B).
- There is no single feeling of need, nor dissatisfaction with current service, common to all demographic, economic and social groups but rather a cacophony of competing dissatisfactions; for this reason, the word "need" is inappropriately objective and artificial in this context. New York City does not have transportation "needs" so much as it has competing interests in particular changes and improvements in public transportation; these interests are possible trade-offs for further action, which only the political process can determine (Section II.C).

- Fare structures and costs are important--but not overwhelming--priorities among New York City transit users; factors like safety, cleanliness, guaranteed seats, and rapid, on-time arrival appear to be among the priorities users might consider before the stability of transit fares. Indeed, the public seems willing to accept higher fares to fund high-priority improvements (Sections III.C and IV.B).
- Transit usage is not particularly sensitive to fare level and may be only slightly more sensitive to transit improvements; hence Moynihan-Holtzman is not likely to increase greatly ridership of mass transportation (Section IV.B.4).
- There is support for either absolute or constant-dollar stability of fares, but this is partially viewed as a social welfare measure by those who do not themselves make much use of mass transit; hence fare stability is not likely to reduce automobile use significantly (Section IV.B.4).
- In general, there is considerable public satisfaction with New York City mass transit in terms of hours of service, proximity of routes and waiting times, somewhat less satisfaction with on-time service and travel-time, and widespread apprehensiveness about security. People are willing to pay - either through increased fares or taxes - for desired transit improvements (Section III.C).
- The specific standards proposed for safety, reliability, and crowding are noticeably lower (less stringent) than standards used by other transit operators, state DOT's, or metropolitan planning organizations (Section III.B).
- The standards proposed for noise, environment and security, and availability and convenience are stated in very broad terms and would be very difficult to implement (Section III.B).

- The issue of special needs of user groups such as the poor, elderly and handicapped is not appropriately addressed, no funds are budgeted, and no funding sources are identified (Sections III.B and V.A).
- The budget level is insufficient to implement even the proposed transit improvements. Assuming modest values for future inflation and unemployment rates, an operating deficit of $158 to $371 million is expected (Section V.A).
- The projection of operating assistance funds past 1982 is developed by methodology which may result in an over-estimation of funds available for 1983 (Section V.B).
- Fare stabilization is the major line-item cost in the budget. The current operating subsidy for NYC transit is comparable to other metropolitan areas; consequently, if proposed fare stabilization is implemented, NYC riders will be subsidized at twice that rate (Section V.B).

APPENDIX A

ANALYSIS OF OPERATING BUDGETS PROPOSED IN THE MOYNIHAN-HOLTZMAN SUBMISSION

APPENDIX A

ANALYSIS OF OPERATING BUDGETS PROPOSED IN THE MOYNIHAN-HOLTZMAN SUBMISSION

1. Review of Proposed NYCTA Operating Budget

Table V-3 of the Moynihan-Holtzman Submission presents a proposed annual operating budget for the New York City Transit Authority through 1983. This Table is actually for operations as proposed in the S.I.P. rather than for meeting basic transportation needs and is presented in current rather than constant dollars. The following is a line by line review of this proposed operating budget.

a. Farebox Revenue

Farebox revenue is assumed to increase at roughly one percent per year, based on an economic resurgence in New York City. Ridership, and thus revenue, are tied directly to C.B.D. employment. It is also assumed that the fare will remain at fifty cents through 1981. This is not grossly inconsistent with data presented in "A New Direction in Transit," Table X11-8, which shows farebox revenues increasing by 3.5 percent from 1975-76 to 1976-77, and by 0.6 percent from 1976-77 to 1977-78.

However, the assumption of an economic resurgence may be unrealistic. Throughout the summer of 1979 all economic indicators have pointed to an approaching recession - which may or may not be major. At any rate, it calls into question any forecasts based upon continued increases in employment. It is worth noting that New York City typically fares worse in hard times than the rest of the nation. It is thus fruitful to consider illustrations of the impact of a recession on estimated farebox revenue.

Assume that a recession begins in late 1979 and produces a one percentage point increase in unemployment in the City by 1980 and a two percentage point increase by 1981. Assume also that this holds constant through 1983. Assuming a direct relationship between employment (unemployment) and ridership (and thus farebox revenues), this results in a 1% decline in farebox revenues by 1980 and an additional 1% decline by 1981. Revenues would also hold constant from 1981 to 1983. Table A-1 shows the changes in farebox revenues under these assumptions relative to those forecast in the M-H Submission.

Since the fare is being held constant through 1981, it is reasonable to interpret this as decline in the real price (due to inflation). It has been shown that a slight increase in ridership can be expected to result from fare decreases, so it is appropriate to include a price effect which will somewhat counter the employment effect. Thus, the above scenario is modified to assume that ridership (and thus farebox revenues) decreases by only 0.5 percent from 1979 to 1980 and another 0.5 percent from 1980 to 1981. Revenues will hold constant from that point through 1983. Table A-2 shows the results of these assumptions, relative to forecasts of farebox revenues in the Moynihan-Holtzman Submission. It should be noted that these ridership rates fall below those included in the preliminary 1980-1983 financial plan for the NYCTA, but they are useful for illustrative purposes.

It is clear that the estimates of farebox revenues in the Moynihan-Holtzman Submission may not be as conservative as claimed. On the other hand, the effect of slight variations in ridership on total income is small - three percent or less by 1983 - and is probably of little interest relative to the total budget.

TABLE A-1

CHANGES IN FAREBOX REVENUES ASSUMING A DECLINE IN N.Y.C. EMPLOYMENT

(REVENUES IN $ MILLIONS)

	CFY 79	CFY 80	CFY 81	CFY 82	CFY 83
M-H Forecasts	725	731	738	745	754
Recession Forecasts	725	718	711	711	711
Total change	-	13	27	34	43
% Change in Total Farebox Revenues	-	1.8	3.7	4.5	5.6
% Change in Total Income	-	1.0	1.9	2.3	2.9

TABLE A-2

CHANGES IN FAREBOX REVENUES ASSUMING A DECLINE IN EMPLOYMENT AND A PRICE EFFECT

(REVENUES IN $ MILLIONS)

	CFY 79	CFY 80	CFY 81	CFY 82	CFY 83
M-H Forecasts	725	731	738	745	754
Recession Forecasts with Price Effect	725	721	717	717	717
Total Change	-	10	21	28	37
% Change in Total Farebox Revenues	-	1.3	2.8	3.7	4.8
% Change in Total Income	-	0.7	1.5	1.9	2.5

b. Non-Farebox Revenues

Non-farebaox revenues are projected to increase at an annual average of 1.7 percent over the 1979-1983 period (the entire increase is shown between 1981 and 1982). "A New Direction in Transit," (Table XII-8) indicates that this component of revenue increased by almost 13 percent from 1975-76 to 1976-77, and by 17 percent from 1976-77 to 1977-78. Thus, the forecasts in the Moynihan-Holtzman Submission show a leveling off of the recent growth trend, and may be quite conservative. Again, changes in non-farebox revenues will have an extremely small impact on total income. If an annual rate of increase of 15 percent were assumed, non-farebox revenues would equal $26 million by 1980. This represents a change in total revenues of only 0.6 percent.

In conclusion, the Moynihan-Holtzman Submission forecasts of revenues to be generated over the 1979-1983 period may be less conservative than indicated. In the event of a recession, revenues may be overstated by 3.0 percent and total income overstated by 1.5 to 2.0 percent. These variations certainly fall within an expected margin of error for forecasts of this type.

c. Government Assistance

Government assistance is shown in Table V-3 to hold at 43 to 44 percent of total income over the 1979-1983 period. The annual rate of increase in Government assistance over this period is shown as 4.8 percent.

Federal Section 5 Operating Assistance. This category of funding deals with federal dollars allocated under formulae modified by the Surface Transportation Act of 1978 which also increased the federal funding levels through 1982. It is difficult to assess the reliability of forecasts of these funds since they are dependent on several levels of appropriation and allocation. Table X11-9 in "A New Direction in Transit" shows the NYCTA's share of appropriations in FFY 1978 and 1979, along with authorizations for FFY 1979, 1980, 1981, 1982. If the average NYCTA share for 1978 and 1979 is applied to the appropriations, NYCTA Section 5 funds for future years are estimated as follows:

FFY 79	FFY 80	FFY 81	FFY 82	Total
$128 mil.	$140 mil.	$149 mil.	$160 mil.	$577 mil.

Note that these figures reflect authorizations rather than appropriations. Nonetheless, a comparison of these figures with those in the Moynihan-Holtzman Submission (Table V-3) is instructive.

CFY 79	CFY 80	CFY 81	CFY 82	CFY 83	Total
$85 mil.	$142 mil.	$165 mil.	$171 mil.	$205 mil.	$788 mil.

Only years 1979-1982 can be compared since no federal authorization for FFY 1983 exists. The total funding indicated in Table IV-3 for 1979-1982 is $583 million, very close to the figure estimated using a constant share of authorizations. The Moynihan-Holtzman Submission indicates a shifting of funds from 1979 to later years (this is discussed further on page 78 of the Submission). That shift cannot continue beyond 1982, however. To satisfy the Section 5 forecasts in the Moynihan-Holtzman Submission, it is necessary to assume that the NYCTA will collect a larger share of federal funds than it has in the past (an assumption stated in the M-H Submission) or that federal funding levels will be increased. Neither assumption can be verified at this time. If federal funding beyond 1982 continues the trend shown in present authorizations, and if NYCTA does not increase its share of those authorizations, the shortfall in federal funds (assuming shifting of 1979 funds through 1981) could come to $50 million.

As a final observation, it should be noted that the estimates of federal operations assistance in the Moynihan-Holtzman Submission are much larger than those in the preliminary Financial Plan for 1980-1983 prepared for the Transit Authority, which show funding increases beyond those recommended by the President ($114.6 million for FFY 80) - substantially below authorization. The actual fate of funding in this category is beyond the hands of NYDOT. The M.T.A. is applying for its full share of Section 5 operating funds and will no doubt continue to do so. Actual funds made available will be dependent on Federal legislation and allocation decisions made through the Tri-State Regional Planning Process.

. New York State Operating Assistance. This category of assistance is obviously dependent on State appropriations, which cannot be guaranteed. The program was initiated in 1974 and funding to NYCTA held constant at $70 mil. annually until 1979 when it was increased to $100 mil. This increase appears to reflect the agreement by the State to pick up $30 million of the $48 million cost of the 1978 labor contract. However, that agreement called for the State to carry the entire $48 million in 1979-80, a fact which is not fully reflected in the forecast of $100 million through 1983.

. New York State Operating Assistance (City Match). This category of funding is essentially formula based. To the extent that the State's program remains constant, the City's match will do so as well. The annual figure of $70 million is forecast to hold constant through 1983. Note that the 1979 figure includes the City's share of the 1978 labor contract agreement (the State's share of that cost is discussed above).

. T.B.T.A. Transfer of Surplus. As required by law, surplus revenues of the Triborough Bridge and Tunnel Authority must be transferred to the M.T.A. for commuter rail operations purposes. The NYCTA's share has stayed close to $69 million since 1976-77. The Moynihan-Holtzman Submission predicts that these surplus revenues will increase at an increasing rate (1.4 percent from CFY 79 to CFY 80 to 5.3 percent from CFY 82 to CFY 83). These forecasts may be quite reasonable except for the possibility that the T.B.T.A. may finance the City's new Convention Center, in which case surplus revenues may decrease substantially. This possibility is not discussed in the Moynihan-Holtzman Submission.

. New York City Reimbursements. This category includes reimbursements for such items as Transit Police, reduced school fares, reduced Senior Citizens' fares, etc. The Moynihan-Holtzman Submission shows City reimbursements increasing from $215 million in CFY 79 to $220 million in CFY 83, a rate of increase of roughly 0.5 percent per year. The CFY 79 figure of $215 million reflects a 5 percent increase over the 1977-78 figures presented in "A New Direction for Transit." However, in Executive Budget - Fiscal Year 1980, Message of the Mayor, the 1980 City contribution is shown as $287.5 million, a figure which includes both City matching funds and reimbursements. This is consistent with the Moynihan-Holtzman Submission; it appears that this category of income is realistically estimated. (The Mayor's message states that $25 million of the $70 million matching funds will come out of the Capital Budget in 1980 so there may actually be a $25 million increase in reimbursements.) It should also be noted that in the Moynihan-Holtzman Submission the estimated City reimbursements do not reflect the fact that the City is paying roughly $170 million annually for debt service for the NYCTA.

This review suggests that the Moynihan-Holtzman Submission may be over-estimating government assistance by as much as $50 million in 1983, assuming that T.B.T.A. transfers hold constant. This is approximately 7 percent of total government assistance and 3 percent of total income. This shortfall, if it should occur, will require doubling the additional income/savings category. The sources of these additional funds are not identified.

d. Expenses

Expenses are divided into Operating and Non-Operating, with Operating accounting for roughly 90 percent of the total (this does not include Capital Investment).

The biggest single component of operating expenses is Salaries and Wages (over 60 percent of total operating expenses), followed by fringe benefits (over 20 percent of total). Thus, employee costs constitute four out of five operating dollars. The Moynihan-Holtzman Submission forecasts are based on the assumption that these costs will increase at 4% per year from 1980 to 1983. This is in marked contrast to past trends. Since the figures in Table V-3 of the Submission are in current dollars, it appears that they propose a real reduction in wages, salaries and fringes unless the rate of inflation falls below 4 percent per year. This reduction would occur during a period when ridership is projected to increase by 1 percent per year and maintenance and repair operations are to be expanded. It seems reasonable to assume that real wages and salaries of NYCTA employees will not go down - at best they will match inflation. If average wages increase at the rate of inflation, and if total wages, salaries and fringes increase at a rate less than inflation, the number of employees must decrease according to:

$(1+ r^{TW}) = (1+r^{N}) (1+r^{AW})$ where:

r^{TW} = Annual rate of change in total expenditures on wages/salaries, and fringes,

r^{N} = Annual rate of change in Number of employees, and

r^{AW} = Annual rate of change in average wages/salaries and fringes.*

Assuming that total expenditures on wages/salaries and fringes increased at an annual rate of 4 percent, an annual inflation rate of 8 percent will require a reduction in employees of 3.7 percent per year. If this occurs over the three year period from 1980 to 1983, the total reduction in employees will be 14 percent. Inflation rates of 10 percent and 12 percent will generate reductions in employment by 1983 of 20 percent and 25 percent, respectively. It seems unlikely that such decreases in the NYCTA work force can be accommodated by increases in productivity alone. There must be a cutback in operations.

Productivity in the United States has not been increasing rapidly in recent years - it has declined slightly. However, since the equipment used by NYCTA is quite old, it may not be unreasonable to assume a slight increase in productivity, say 2 percent, associated with equipment upgrading. This can be reflected in a 2 percent reduction in the total number of employees. Using the relationship developed above, assuming that average wages/salaries and fringes keep pace with inflation, it can be shown that the total expenditure on wages/salaries and fringes must increase by 5.8 percent, 7.8 percent and 9.8 percent for inflation rates of 8, 10 and 12 percent respectively. Applying these rates to the CFY 80 figures for wages/salaries and fringes yields the following (Table A-3) estimates for CFY 81, 82 and 83.

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*Derivation on following page.

Footnote

TW = Total Wages, Salaries and Fringes Expenditures

N = Number of Employees

AW = Average Wage/Salary and fringe per employee

$$TW = N \cdot AW$$

TW' = Total Wages, Salaries and fringes after 1 time period

$= TW\,(1+ r^{TW})$

N' = Number of Employees after 1 time period

$= N\,(1+ r^{N})$

AW'= Average Wage ... After one time period

$= AW\,(1 + r^{AW})$

r = Respective annual rates of change

$$TW' = N' \,.\, AW'$$

$$\frac{TW'}{N'} = AW'$$

$$\frac{TW(1+r^{TW})}{N(1+r^{N})} = AW(1+r^{AW}) \quad \text{but} \quad \frac{TW}{N} = AW$$

$$\therefore \quad \frac{AW(1+r^{TW})}{(1+r^{N})} = AW(1+r^{AW})$$

$$\frac{(1+r^{TW})}{(1+r^{N})} = (1+r^{AW})$$

$$\frac{(1 + r^{TW})}{(1+r^{N})(1+r^{AW})} = 1$$

$$(1+r)^{TW} = (1+r^{N})(1+r^{AW})$$

TABLE A-3

COMBINED FORECASTS OF SALARIES/WAGES PLUS FRINGES, FOR VARIOUS INFLATION RATES (NYCTA)
(IN $ MILLIONS)

	CFY 80	CFY 81	CFY 82	CFY 83
M-H Forecasts	977	1,053	1,074	1,120
8% Inflation	977	1,033	1,094	1,157
10% Inflation	977	1,053	1,135	1,224
12% Inflation	977	1,073	1,178	1,293

TABLE A-4

FORECASTS OF FUEL AND POWER EXPENDITURES, ASSUMING CONSTANT CONSUMPTION AND PRICES MATCHING INFLATION (NYCTA)
(IN $ MILLIONS)

	CFY 79	CFY 80	CFY 81	CFY 82	CFY 83
M-H Forecasts	91	98	103	107	113
8% Inflation	91	98	106	115	124
10% Inflation	91	100	110	121	133
12% Inflation	91	102	114	128	143

Thus, modest assumptions about inflation rates, real wage rates and productivity yield estimates of future wage/salary and fringe expenditures which range from $37 million to $177 million above those in the Moynihan-Holtzman Submission. This equals from 2.5 percent to 11.5 percent of total expenditures, a substantial variation.

Fuel and Power expenditures are also difficult to estimate. The Moynihan-Holtzman Submission shows those expenditures increasing at slightly over 5.5 percent per year, a rate that may not even keep pace with inflation. It certainly doesn't reflect recent experience in prices of either petroleum based fuel or electricity.

The relationship developed for wages/salaries and fringes is equally applicable here. Assuming a growth rate in expenditures of 5.5 percent, and that prices increase at the rate of inflation (conservative relative to recent history), inflation rates of 8, 10 and 12 percent generate reductions in energy use of 2.3, 4.0 and 6.0 percent respectively. This obviously requires substantially greater energy efficiency or a curtailment of operations.

Energy efficiencies are generally difficult to achieve, especially in view of the current program to convert to air conditioned subway cars at the rate of 800-1,000 cars per year through 1982. While data are not available on energy needs of air conditioned cars, it is clear that they require more than can be provided by the existing third rail on some lines. Thus it seems unreasonable to expect total energy use to decline in the forthcoming years. Assuming it holds constant and that energy prices keep pace with inflation, the rate of growth in fuel and power expenditures must also equal the inflation rate. Depending on the inflation rate, estimates of fuel and power expenditures can be made for CFY 80, 81, 82 and 83 (see Table A.4). These estimates exceed those in the Moynihan-Holtzman Submission for 1983, by from $11 million to $30 million (0.7 percent to 2.0 percent).

The final category of operating expenditures shown on Table V-3 of the Moynihan-Holtzman Submission is an undefined "other" category. This is projected to increase at a decreasing rate (9 percent from CFY 79 to CFY 80, 6 percent from CFY 82 to CFY 83), which averages 6.7 percent. Without knowing more about this category of expenditures, it is impossible to say whether the estimates are realistic. It will be assumed that they are as good as can be made.

Table V-3 of the Moynihan-Holtzman Submission also includes three items of expenditure listed as Non-Operating: Debt Service; Capital Engineering; and Transit Police.

Debt Service is shown to decrease substantially from CFY 82 to CFY 83. Since Debt Service is readily calculated from currently outstanding debt, it seems unnecessary to question this figure. It bears repeating here that the City is also paying some $170 million per year in debt service for the NYCTA.

Capital Engineering is shown to increase very slightly over the four year period - an average rate of increase of 1.5 percent per year. While this may not be unreasonable given that anticipated capital investments will involve little expansion of the system, it should be noted the CFY 79 figure is substantially higher than that shown for 1978 in "A New Direction in Transit." This presumably reflects the State's policy of upgrading the overall capital engineering program so as to facilitate the use of available capital grants.

The final category of Non-Operating Expenses is that of the Transit Police. Police expenditures are shown to increase at 2 percent per year (from $96 million in CFY 79 to $104 million in CFY 83). It should be recalled that the City reimburses the N.Y.C.T.A. for transit police expenditures. Thus, variations here will be matched by variations in City reimbursements.

It appears that the operating expenses listed on Table V-3 of the Moynihan-Holtzman Submission understates expenditures without justification. Such justification must confront issues of increased worker productivity/decreased work force, increased energy efficiency/decreased energy consumption. Making modest assumptions about these factors, it is estimated that operating expenditures will exceed those in the Moynihan-Holtzman Submission by anywhere from $48 million to $203 million in CFY 83 (see Table A.5). This amounts to some three to thirteen percent of total estimated expenditures.

TABLE A-5
UNDERSTATEMENT IN FORECASTS OF 1983 OPERATING
EXPENDITURES FOR NYCTA
(IN $ MILLIONS)

	8% Inflation	12% Inflation
Wages/Salaries and Fringes	37	173
Fuel and Power	11	30
Other	-	-
Total	48	203

2. Review of the Proposed MTA Commuter Rail Operating Budget

Reviewing the proposed operating budget for MTA's Commuter Rail Operation (Table V-4 of the Moynihan-Holtzman Submission) is difficult due to the dearth of historical data with which to construct trends. Thus, one must rely subjective judgments of the trends apparent in the forecasts. It should be noted that the Commuter Rail Budget is roughly one third that of the NYCTA; thus fluctuations around the forecasts will have a smaller impact on the total MTA budget than will fluctuations around the forecasts for the NYCTA.

a. Farebox Revenues

For Commuter Rail Operations, farebox revenues account for three-fourths of all revenues and forty percent of all income. This holds relatively constant through 1983 except that the proportion of total income provided by fareboxes declines slightly from 41 percent in 1979 to 38 percent in 1983. Of all income sources, farebox revenues are shown to increase at the lowest rate,1.6 percent annually. Still, this is a slightly higher rate of increase than projected for NYCTA which is constrained by the fixed fare. Since the fixed fare doesn't apply to commuter operations, the low rate of increase in farebox revenues must reflect either a decrease in ridership or a decrease in fare relative to the cost of living. If fares increase along with the cost of living, the 1.6 percent rate of increase in farebox revenues reflects a ridership decline of 6, 8, or 10 percent for inflation rates of 8, 10, or 12 percent respectively. If ridership grows at the rate projected for NYCTA, 1 percent per year, real fares must decline by 7, 9, or 10 percent for inflation rates of 8, 10 and 12 percent respectively. Since neither relative fare decreases nor declines in ridership of this magnitude seem likely by 1983, it appears that the Moynihan-Holtzman estimates of farebox revenues may be understated, but the magnitude of the understatement is highly dependent on fare policy. For illustrative purposes, if fares are allowed to keep pace with inflation and ridership holds constant, revenue increases of from $53 million for an 8 percent inflation rate to $91 million for a 12 percent inflation rate will be generated.

Non-farebox Revenues

Non-farebox revenues account for roughly 25 percent of all revenues throughout the forecast period. As a proportion of total income, they decline slightly from 30.8 percent in 1978 to 27.7 percent in 1983, but this reflects more an increase in government assistance than a decrease in non-farebox revenues.

Non-farebox revenues are projected to increase at a rate of 3.2 percent per year. The source of non-farebox revenues is unclear but probably includes track fees for freight shipment, advertising, concessions, etc. However, without further information it is impossible to say more than that the projections don't match inflation rates, and thus may be conservative.

Total revenues, composed of farebox and non-farebox revenues, are projected to increase at the modest rate of 2.1 percent per year. Based on the above discussion, these projections seem conservative and may understate total revenues over the projection period.

c. Government Assistance

Governmental assistance includes four revenue sources: Federal Section 5 Operating Assistance; New York State Operating Assistance, State Share; New York State Operating Assistance, Local Share; and Other. Of these, the two parts of the New York State Operating Assistance Program are assumed to hold constant over the projection period, an assumption consistent with that used in the NYCTA forecasts.

Federal Section 5 Operating Assistance is shown increasing substantially from 1978 to 1979 and is then projected to increase at an annual rate of 3 percent, which is considerably below that used for the NYCTA budget projections. Since both projections assume a constant share of Section 5 funds allocated to the New York State portion of the urbanized area, one wonders why the growth rates are not the same. However, as was pointed out in the review of the NYCTA proposed operating budget, Section 5 funds appear to have been overstated. According to Table XII-9 of "A New Direction of Transit," Federal Section 5 authorizations through 1982 show an annual increase of 8.9 percent from 1979, including Basic, Second Tier and Urban Rail programs. Again, this suggests that the Federal Operating Assistance projected for commuter rail activities is understated. However, given the vagaries of appropriations and allocations, these projections may be realistic.

'Other' government assistance, the final component of government assistance income, is shown as dropping from 1978 to 1979, and then increasing at an annual rate of 7.4 percent through 1983. These funds reflect payment of real costs, i.e., L.I.R.R. freight deficits, local station maintenance costs, etc., and it seems reasonable that they increase at a rate consistent with a modest rate of inflation.

In summary, total income for Commuter Rail Operations is projected as increasing at a very modest 3.4 percent per year from 1979 to 1983. Most of the components are estimated conservatively, suggesting that total income may be somewhat understated. It is, however, impossible to estimate the magnitude of the understatement.

d. Expenditures

The two major components of operating expenditures are wages and salaries and fringe benefits. The former is projected to increase from 1979 to 1983 at an annual rate of 4.6 percent and the latter at 4.9 percent. This is slightly above the 1978 labor agreement for the NYCTA but below the trend of other recent labor agreements. If it is assumed that wages/salaries and fringes will keep pace with inflation, the model developed for the review of the proposed NYCTA operating budget indicates that the total number of employees must decrease annually by 3, 5 or 7 percent for inflation rates of 8, 10 or 12 percent respectively. While increased productivity may allow some reduction in work force, it is unlikely that productivity can continually absorb work force cuts in this range.

If a productivity increase of 2 percent per year is accepted and reflected in a 2 percent annual reduction in employees, expenditures on wages/salaries and fringes must increase at annual rates of 5.8, 7.8 and 9.8 percent for inflation rates (for average wage rate increases of 8, 10 and 12 percent respectively). Table A-6 shows the impact on expenditures. The Moynihan-Holtzman estimates may be understated by from $19 million to $66 million by 1983. This amounts to from 3.6 percent to 12.7 percent of total expenditures.

Expenditures for fuel, power and utilities constitute roughly 10 percent of total operating expenditures for the MTA commuter rail operations. These expenditures are projected to increase at an annual rate of 5.6 percent from 1979 to 1983, a rate considerably below recent trends in energy prices. Accepting the conservative assumption that energy prices will keep pace with inflation, the rate of increase of 5.6 percent implies annual reductions in

TABLE A-6

COMBINED ESTIMATES OF SALARIES/WAGES PLUS FRINGES FOR COMMUTER RAIL, FOR VARIOUS INFLATION RATES

(IN $ MILLIONS)

	1980	1981	1982	1983
M-H Forecasts	337	351	365	380
8% Inflation	337	357	377	399
10% Inflation	337	363	392	422
12% Inflation	337	370	406	446

TABLE A-7

FORECASTS OF FUEL, POWER AND UTILITIES EXPENDITURES FOR COMMUTER RAIL ACTIVITIES ASSUMING 2% REDUCTION IN CONSUMPTION AND VARIOUS INFLATION RATES

(IN # MILLIONS)

	1980	1981	1982	1983
M-H Forecasts	47	50	53	56
8% Inflation	47	50	53	56
10% Inflation	47	51	55	59
12% Inflation	47	52	57	62

energy consumption of 2.2, 4, or 5.7 percent for inflation rates of 8, 10 and 12 percent respectively.

While a sustained two percent annual reduction may be reasonable, higher reductions probably require major changes for which there is no justification. Assuming an annual reduction of two percent, with energy prices keeping pace with inflation, expenditures on energy must increase at annual rates of 5.8, 7.8 or 9.8 percent for inflation rates of 8, 10 and 12 percent respectively. Table A-7 shows the impact of these assumptions on annual expenditures for energy. It appears that the Moynihan-Holtzman estimates are consistent with the 8 percent annual inflation rate and a 2 percent annual reduction in energy consumption. At higher rates of inflation, the Moynihan-Holtzman estimates fall short by as much as $6 million in 1983. However, this is only 1.1 percent of total expenditures and is probably within the expected confidence interval of the total estimates.

The final category of Operating Expenditures is designated "Other." It is held roughly constant, increasing at an annual rate of just 0.9 percent from 1979 to 1983. While it is somewhat difficult (in the absence of detailed information) to justify holding this category constant in the face of inflation, it is equally difficult to establish an appropriate rate of change. Some of the components such as leases, rentals, and insurance may be fixed contractually throughout the projection period. Others may increase at an unknown rate, depending on consumption and price.

Assuming that 1980 expenditures are easily predictable, and that they will grow at half the inflation rate from 1980 to 1983, the understatement inherent in the Moynihan-Holtzman projections ranges from $4 million for an 8 percent inflation rate to $9 million for a 12 percent inflation rate. At most this constitutes only 1.7 percent of total expenditures.

In total, it appears that operating expenditures for MTA commuter rail activities are somewhat understated by 1983 (see Table A-8).

TABLE A-8

UNDERSTATEMENT IN FORECASTS OF OPERATING EXPENDITURES FOR COMMUTER RAIL ACTIVITIES, 1983 (IN $ MILLIONS)

	8% Inflation	12% Inflation
Wages/Salaries and Fringes	19	66
Fuel, Power and Utilities	0	6
Other	4	9
Total	23	81

This amounts to from 4.4 percent to 15.6 percent of total estimated expenditures in 1983. While it was suggested that income was also understated, it is not likely that all of the increased expenditures can be covered. Thus expected deficits will be much larger than shown in the Moynihan-Holtzman Submission. There is no indication of how these deficits will be covered.

APPENDIX B

EXHIBITS FOR

SECTION II.C BASIC TRANSPORTATIONS NEEDS IN THE NEW YORK CONTEXT

Exhibit II.C.1

Express Bus and Subway Coverage of the 1970 Population

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

		POPULATION SERVED BY:				PER CENT POPULATION SERVED BY:							
BOROUGH	1970 POPULATION	Express Bus	Sub-way(1)	Both Express Bus & Subway	Either Express Bus or Subway or Both	Ex-press Bus	Sub-way(1)	Both Express Bus & Subway	Either Express Bus or Subway or Both	Express Bus Only	Subway Only	Neither Express Bus Nor Subway	Ratio: Daily Auto Trips to Manhattan CBD ÷Population x 100
Manhat-tan	1,539,233	218,914	1,333,419	154,485	1,397,848	14	87	10	91	4	77	9	.55
Bronx	1,471,701	457,512	953,939	316,739	1,094,712	31	65	22	74	9	43	26	.53
Brooklyn	2,602,012	473,100	1,876,094	239,563	2,109,631	18	72	9	81	9	63	19	.44
Queens	1,986,473	567,716	683,329	154.469	1,096,576	29	34	8	55	21	26	45	.77
Staten Island	295,443	146,666	53,594	33,878	166,382	50	18	11	56	39	7	44	.60
TOTAL	7,894,862	1,863,908	4,900,375	899,134	5,865,149	24	62	11	74	13	51	26	

(1) Subway refers to the Transit Authority rail systém, including routes along elevated and private right-of-way lines; includes SIRTOA on Staten Island; does not include Penn Central or Long Island Railroads, as of July,1975.

SOURCE: Estimated by Wilbur Smith and Associates from 1970 Census data and transit coverage maps. 2,000 feet from subway station of .25 mile from express bus stop.

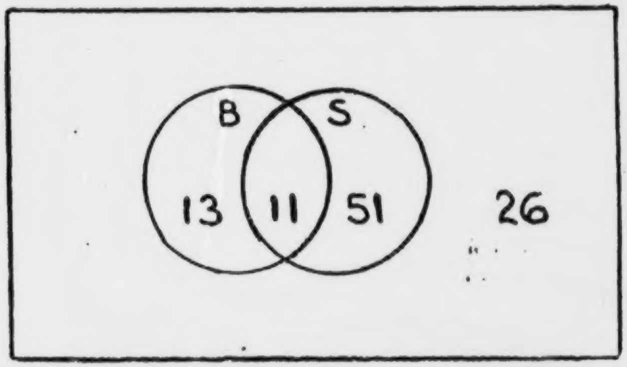
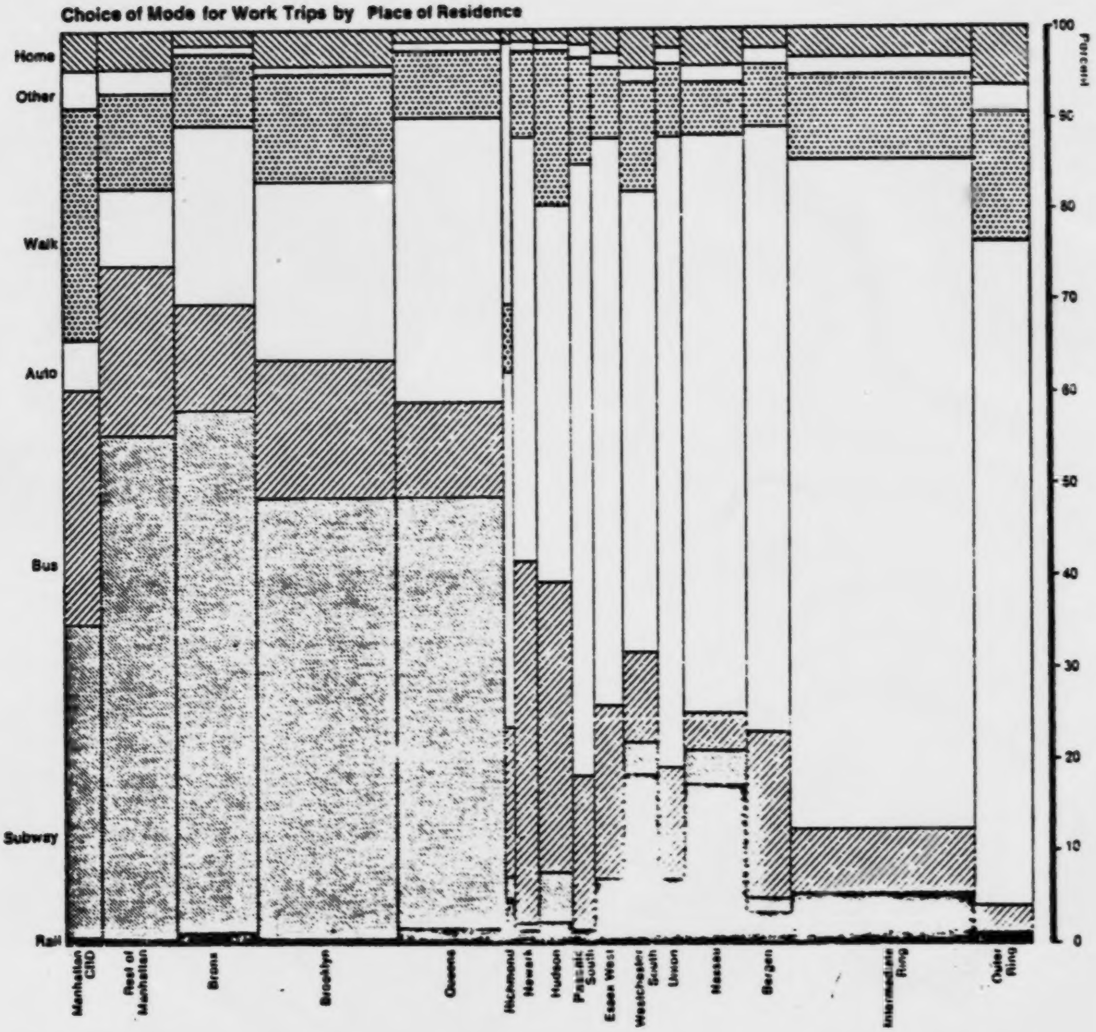


Exhibit II.C.2

Choice of Mode for Work Trips by Place of Residence



Note: Horizontal scale—1 inch=1 million trips; see Table 38 for numerical values.

SOURCE: RPA, Transportation and Economic Opportunity, 1973.

Exhibit II.C.3

MEANS OF TRANSPORTATION INTO MANHATTAN
(Base: Use transportation means other than walking)

							◆- EDUCATION -◆			◆---- AGE ---◆			◆----- INCOME -----◆			
	TOTAL	NON MAN-HA-TTAN TOTAL	QUEENS	BROOK-LYN	BRONX	MAN-HA-TTAN	8TH GDE OR LESS	HIGH SCH	COLL-EGE	18-29	30-49	50 & OVER	UNDR $7M	$7M-$14,999	$15M-$24,999	$25M & OVER
TOTAL ANS	820	623	201	275	147	197	59	409	349	283	300	211	156	313	221	73
1-DRIVE CAR	18%	20%	25%	19%	16%	14%	5%	16%	24%	12%	24%	20%	7%	13%	30%	26%
2-VAN OR CAR POOL	1%	1%	-	2%	1%	1%	-	1%	1%	2%	*	*	-	2%	*	1%
3-SUBWAY	70%	73%	62%	83%	70%	61%	73%	71%	69%	86%	67%	53%	71%	75%	65%	67%
4-EXPRESS BUS	4%	5%	4%	1%	14%	-	-	3%	6%	1%	5%	7%	3%	4%	6%	4%
5-LOCAL BUS	17%	5%	5%	5%	4%	55%	25%	15%	18%	13%	13%	27%	26%	18%	11%	14%
6-TRAIN	3%	4%	7%	1%	3%	-	-	3%	3%	2%	3%	4%	1%	3%	3%	4%
7-TAXI	2%	1%	*	*	1%	5%	2%	1%	2%	1%	2%	3%	3%	1%	1%	5%

SOURCE: NYSPOT, NYers Evaluate Their Transportation System, April 1978.

Exhibit II.C.4

Mode Used for NYC Work Trips Among Various Age Groups

Mode	% of Age Groups Making Work Trips* 18-34	35-54	55+
Auto	21.66	23.55	20.18
Bus	7.39	22.57	18.64
Subway/Railroad	62.50	34.30	38.13
Bus & Subway	2.42	11.75	8.41
Walk/Other	6.03	7.82	23.04

*Columns may not total 100.0% due to rounding

- While the 18-34 group is the most heavily dependent upon the subway for work trips, the 55+ group travels this way more so than the 35-54, although the latter group makes up a larger proportion of riders that use that mode. The 55+ group, in fact, uses the subway more than any other mode to get to work, probably because most of the employment opportunities for that group are located in Manhattan.

- The importance of the 18-34 group among subway riders arises from the nature of employment in Manhattan. The financial and communication professions employ large numbers of young adults, and the thousands of offices that cluster at the lower end of Manhattan depend on a large number of young secretaries for a work force.

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.5

Mode Used for NYC Non-Work Trips Among Various Age Groups

	% of Age Groups		
Mode	**18-34**	**35-54**	**55+**
Auto	**49.24**	**49.16**	**34.67**
Bus	**18.39**	**29.11**	**52.70**
Subway/RR	**22.63**	**17.02**	**6.06**
Subway & Bus	**0**	**0**	**1.60**
Walk/Other	**9.75**	**4.72**	**4.96**

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.6

Mode Used for NYC Work Trips Among Various Income Groups

Mode	% of Income Groups Making Work Trips*						
	0-2999	3000-5999	6000-8999	9000-11999	12000-14999	15000-24999	25000+
Auto	0	21.48	2.19	27.78	16.48	34.22	15.10
Bus	0	0	0	29.31	22.49	12.98	53.22
Subway/Railroad	0	52.54	81.51	28.41	30.07	42.73	16.70
Bus & Subway	0	11.88	7.82	0	9.30	10.07	8.97
Walk/Other	0	14.09	8.49	14.51	21.65	0	6.02

*Columns may not total 100.0% due to rounding

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.7

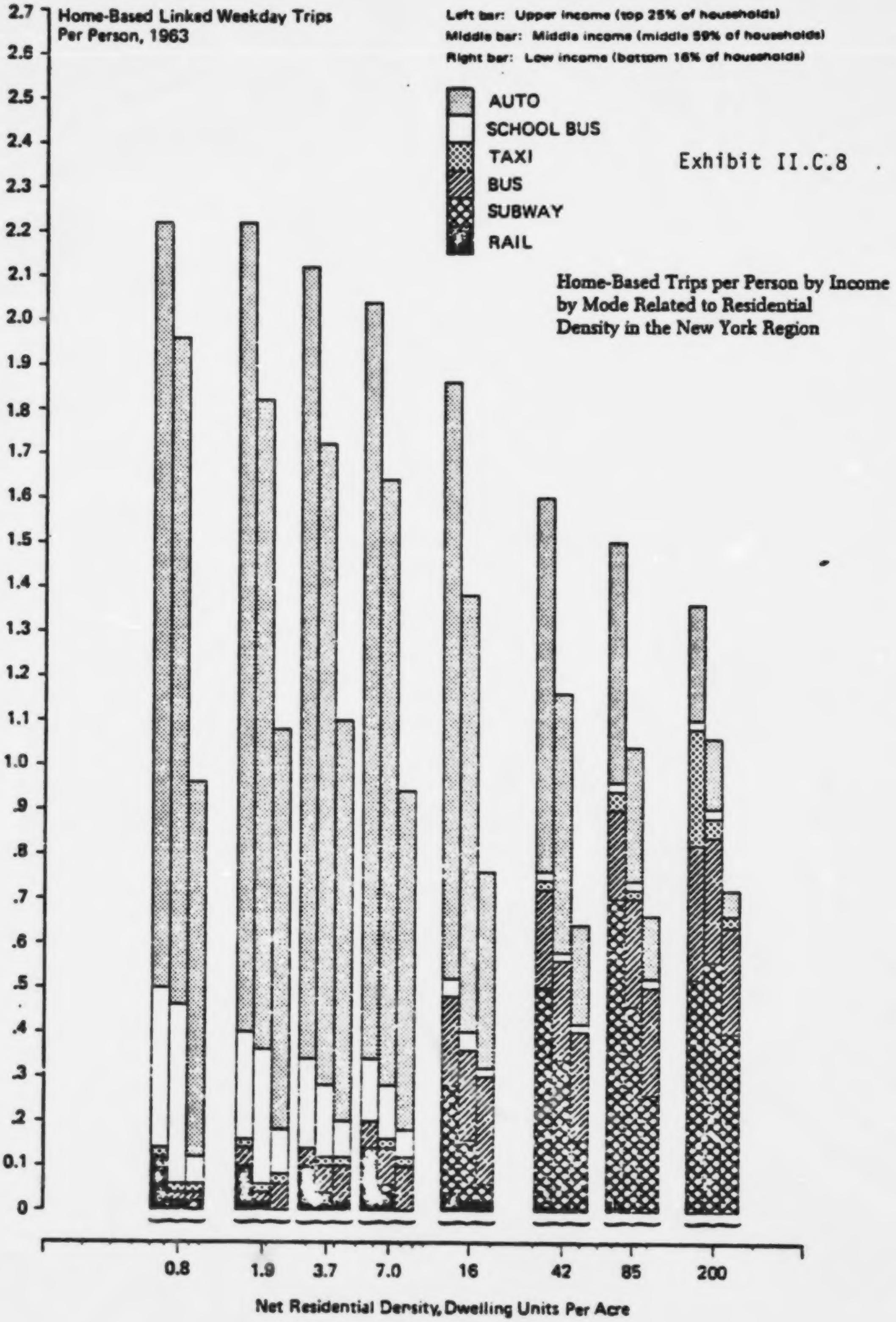
Modes Used for NYC Non-Work Trips Among Various Income Groups

Mode	% Income Groups, in Working Force*						
	0-$2999	$3000-5999	$6000-8999	$9000-11999	$12000-14999	$15000-24999	$25000 +
Auto	37.08	36.89	13.50	43.60	51.30	70.73	57.06
Bus	53.22	33.19	43.66	28.34	28.53	14.48	24.48
Subway/RR	9.70	19.85	37.53	24.36	4.60	10.37	7.68
Subway & Bus	0	0	0	0	0	0	4.12
Walk/Other	0	10.07	5.31	3.70	15.56	4.41	6.66

*Columns may not total 100.0% due to rounding

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.8

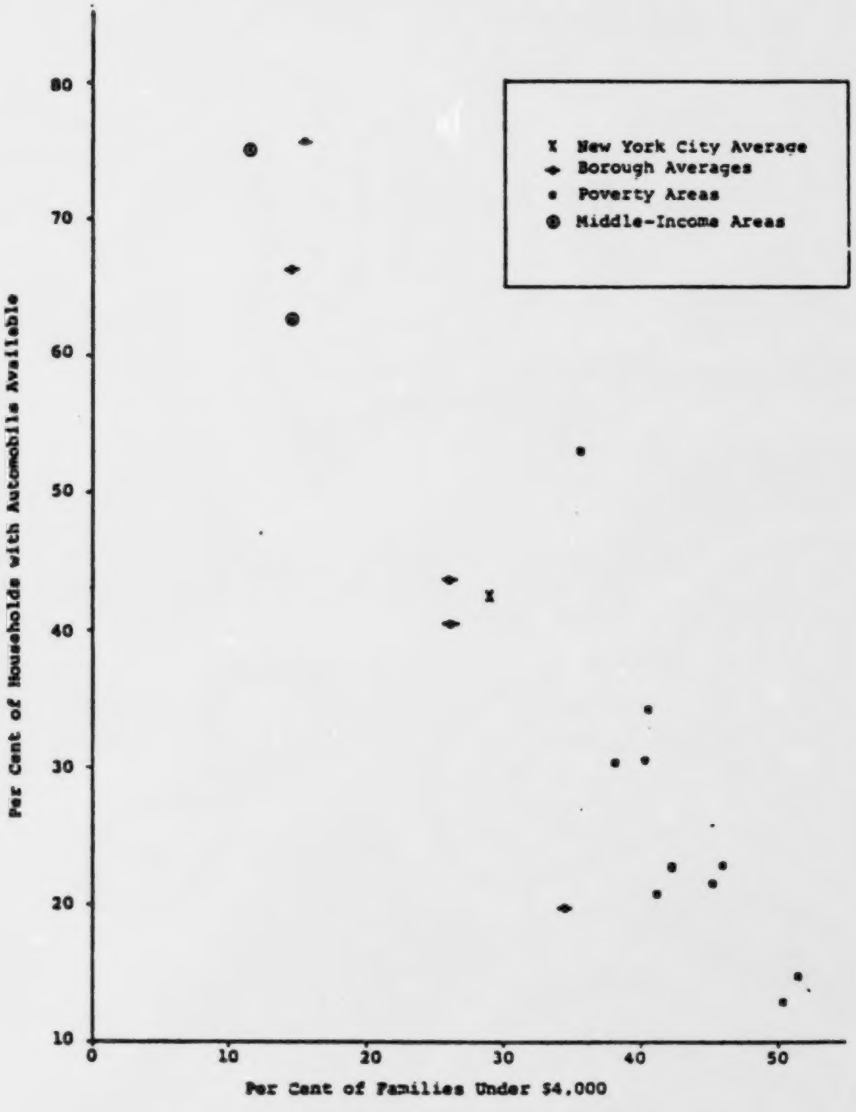


Home-Based Trips per Person by Income by Mode Related to Residential Density in the New York Region

SOURCE: Pushkarev & Zupan, Public Transportation and Land Use Policy, 1977.

Exhibit II.C.9

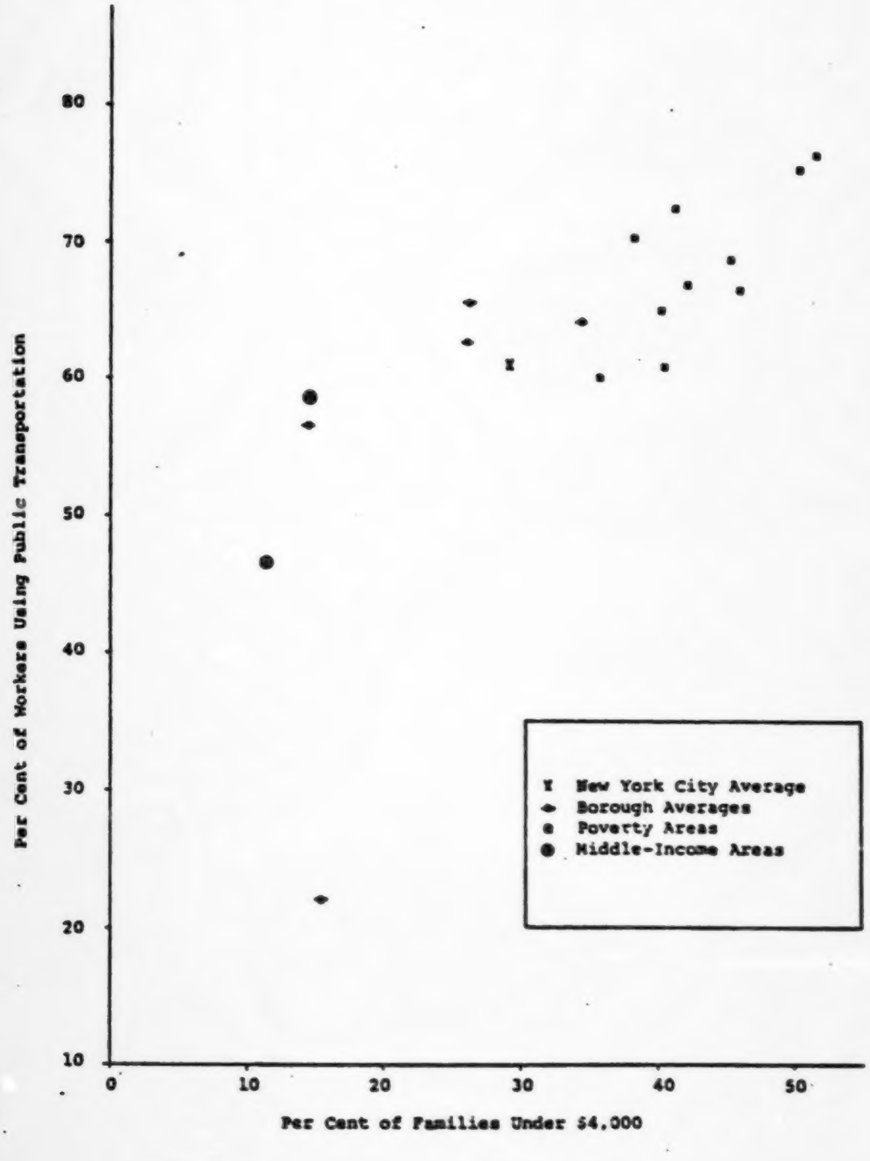
RELATIONSHIP BETWEEN NEW YORK CITY FAMILY INCOME AND AVAILABILITY OF AN AUTOMOBILE



SOURCE: Transportation Needs of the Poor, 1969.

Exhibit II.C.10

RELATIONSHIP BETWEEN NEW YORK CITY FAMILY INCOME AND USE OF PUBLIC TRANSPORTATION FOR THE JOURNEY TO WORK



SOURCE: Ornati, Transportation Needs of the Poor, 1969.

Exhibit II.C.11

Mode Used for NYC Work Trips Among Various Races

Mode	% of Racial Group Making Work Trips*			
	White	Black	Sp. American	Other
Auto	23.32	18.76	24.97	0
Bus	19.60	16.78	0	0
Subway/Railroad	32.12	64.46	59.26	100.0
Subway & Bus	11.55	0	0	0
Walk/Other	13.41	0	15.77	0

*Columns may not total 100.0% due to rounding

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.12

Mode Used for NYC Non-WorK Trips
Among Various Races

% Racial Group Making Work Trips

Mode	White	Black	Sp. American	Other
Auto	47.17	31.52	38.53	100
Bus	34.97	31.76	29.66	0
Subway/Railroad	10.20	30.55	25.72	0
Subway & Bus	.76	0	0	0
Walk/Other	6.90	6.18	6.09	0

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.13

SOURCE: NYC Transit Authority, "A Study of Attitudes toward the NY Subway," June 1975.

Handicaps in Traveling

- Seven out of every 100 New Yorkers have some health problem or handicap. One out of ten Bronx residents have such problems while only three out of 100 Queens resident do.

Incidence of Health Problems or Handicaps

	Total	Queens	Manhattan	Bronx	Brooklyn
	%	%	%	%	%
Have health problem or handicap	7	3	6	10	7
Do not have health problem or handicap	93	97	93	90	92
	100%	100%	99%	100%	100%
(Number of Respondents)	(798)	(200)	(199)	(198)	(200)

- The single most prevelant inhibitor of travel appears to be problems in going up stairs, with over seven out of ten persons who have health problems saying that they do that with difficulty.

Exhibit II.C.14

SOURCE: NYC Transit Authority, "A Study of Attitudes toward the NY Subway," June 1975.

Degree of Difficulty of Actions Among Persons with Health Problems or Handicaps

	With No Difficulty	With Difficulty But No Aid Needed	Aid Needed/ Can't Do At All	Total	
	%	%	%	%	(Number of Respondents
Go up stairs	23	75	2	100%	(53)
Go down stairs	49	49	2	100%	(53)
Go up inclines/slopes	41	57	2	100%	(53)
Stoop/kneel/crouch	54	42	4	100%	(52)
Sit down and get up	69	31	--	100%	(52)
Lift or carry over 10 pounds	42	54	4	100%	(52)
Reach	56	44	--	100%	(52)
Handle or grasp	66	33	--	100%	(51)
Move in crowds	61	39	--	100%	(51)
Use escalators	78	21	--	100%	(51)
Use elevators	86	14	--	100%	(51)
Wait standing	41	57	2	100%	(53)
Go more than one block	69	29	2	100%	(51)

Exhibit II.C.15

Transportation Modes Used in Work and Non-Work Trips, New York State, 1974*

	New York City		Rest of State	
	Work % Total Trips	Non-Work % Total Trips	Work % Total Trips	Non-Work % Total Trips
Automobile	21.6	44.5	78.9	90.7
Bus	15.6	33.1	5.1	5.2
Subway/RR	44.9	15.4	---	---
Subway * Bus	7.3	.5	---	---
Walk/Other	10.5	6.5	16.0	4.1

*Columns may not total 100% because of rounding

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.16

SOURCE: NYC Transit Authority, "A Study of Attitudes toward the NY Subway," June 1975.

- The subway is used by more respondents to get to shopping than any other way of traveling.

Most Often Used

Way of Traveling to Shopping

	Total	Queens	Manhattan	Bronx	Brooklyn
	%	%	%	%	%
Auto	15	27	11	15	10
Subway	77	71	68	74	89
Bus	38	53	20	39	35
Taxi	1	1	--	2	--
Walk	6	7	6	3	7
	137%	159%	105%	133%	141%
(Number of Respondents)	(412)	(90)	(108)	(110)	(106)

(Table adds to more than 100 percent because of multiple answers - e.g., subway and bus.)

Exhibit II.C.17

SOURCE: NYC Transit Authority, "A Study of Attitudes toward the NY Subway," June 1975.

- The subway is used by more respondents to get to their recreation area than any other mode of transportation.

Most Often Used Way of Traveling to Recreation Area

	Total	Queens	Manhattan	Bronx	Brooklyn
	%*	%*	%*	%*	%*
Auto	20	33	10	19	16
Subway	89	95	85	86	87
Bus	33	52	10	28	32
Taxi	1	--	2	1	1
Walk	1	2	2	--	1
	144%	183%	109%	134%	137%
(Number of Respondents)	(385)	(109)	(91)	(88)	(94)

---

* (Table adds to more than 100 percent because of multiple answers - e.g. subway and bus.)

Exhibit II.C.18

How New Yorkers Travel

- Over one out of four New Yorkers use the subway almost every day. Three out of ten, however, use it less often than a few times a month while two out of ten use it only a few times a month.

- Brooklyn has more very frequent and infrequent subway users than any other borough. Three of ten Brooklyn residents use the subway almost every day and over one out of three use it less often than a few times a month.

Frequency of Subway Ridership

Frequency	Total %	Queens %	Manhattan %	Bronx %	Brooklyn %
Almost every day	26	20	25	27	30
A few times a week	9	6	15	8	9
Once a week	15	24	10	16	11
A few times a month	20	18	31	15	16
Less often	30	13	17	34	34
	100%	99%	98%	100%	100%
(Number of Respondents)	(799)	(200)	(200)	(198)	(200)

NYC TRANSIT AUTHORITY, "A Study of Attitudes toward the NY Subway," June 1975.

Exhibit II.C.19

OURCE: NYC Transit Authority, "A Study of Attitudes toward the NY Subway," June 1975.

How New Yorkers Use The Subway

- New Yorkers are almost evenly divided in their main use of the subway: about one out of three use it most often for work, for shopping and for recreation.

- Shopping is the major purpose of using the subway by over four out of ten residents of Manhattan and the Bronx. Among Brooklyn residents, work is the major purpose, with nearly four out of ten using it for that reason. Almost four out of ten Queens residents ride the subway mainly to go shopping or mainly to go out for recreation.

Main Use of the Subway

	Total	Queens	Manhattan	Bronx	Brooklyn
	%	%	%	%	%
Work	32	25	30	32	39
Shopping	38	36	44	41	32
Recreation	30	38	25	27	28
	100%	99%	99%	100%	99%
(Number of Respondents)	(799)	(200)	(200)	(198)	(200)

- Respondents who use the subway mainly for work were asked whether they used it more often for shopping or recreation. The division between shopping and recreation for all respondents is nearly equal. In three of the four boroughs over half the respondents ride the subway mainly for shopping in Queens, however, over half ride it mainly to go out for recreation.

Exhibit II.C.20

Getting Worse Not Better

- The public is not only largely unhappy with the bus and subway system but a majority (52%) also feel it is getting worse compared to five years ago. Only 2% say the system has improved, while 38% believe it has remained about the same. Bronx respondents are more likely than others to feel the system is deteriorating. Almost 2 out of 3 Bronx respondents (65%) say the system has gotten worse, while 28% say it has remained about the same. Queens residents are the least negative, almost evenly divided, 43-42%, between those who rate it worse and those who rate it about the same as five years ago:

COMPARED TO FIVE YEARS AGO, DO YOU FEEL THAT THE BUS AND SUBWAY SYSTEM IN NEW YORK CITY IS GETTING BETTER?
(Base: Total sample)

	TOTAL
TOTAL ANS	923
BETTER	2%
WORSE	52%
ABOUT THE SAME	38%
NOT SURE	7%

SOURCE: NYSDOT, NYers Evaluate Their Transportation System, April 1978.

Exhibit II.C.21

Satisfaction with Subway Service

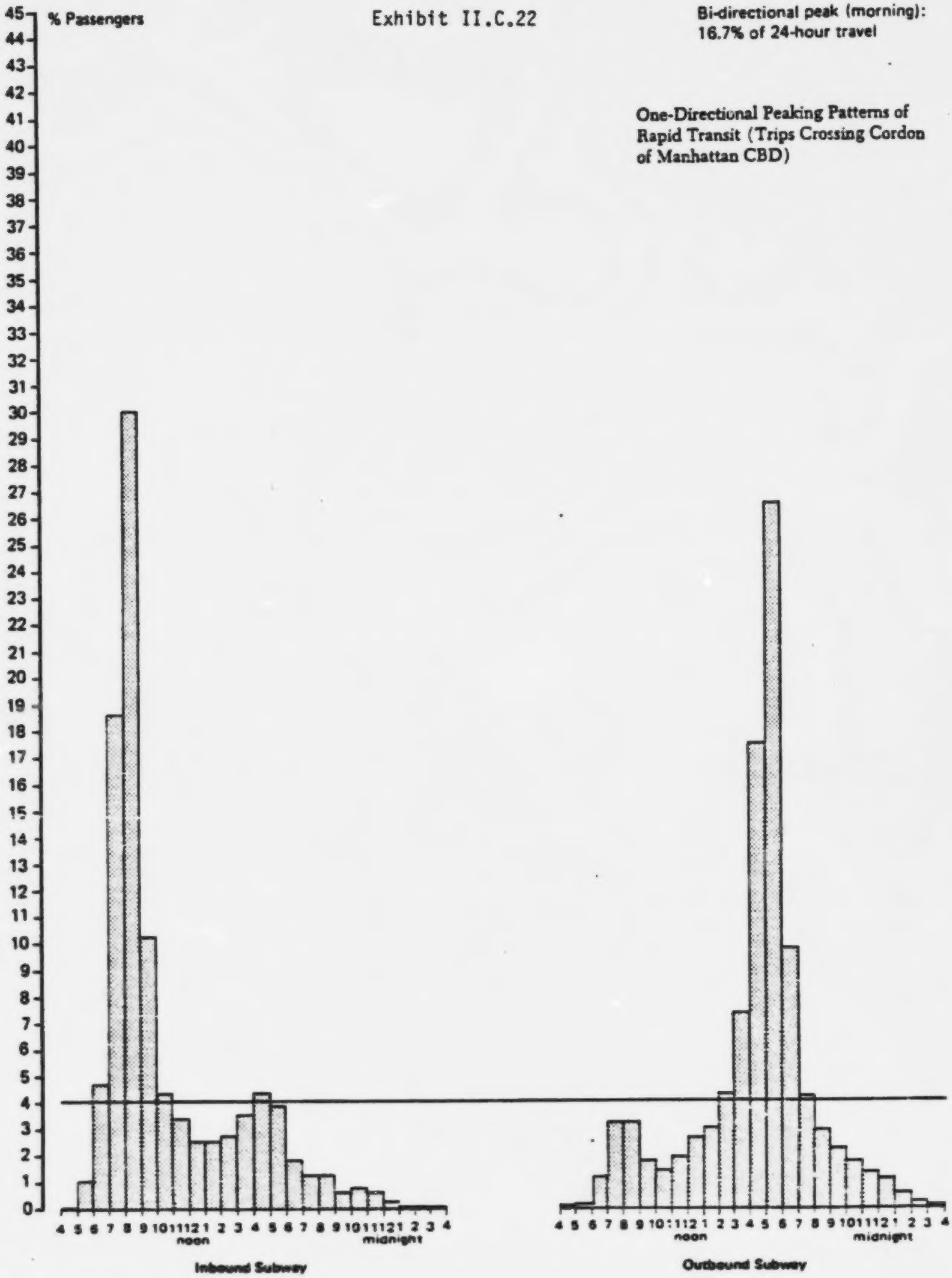
Question
How satisfied are you with the hours of available subway service?

Destination	Satisfied	Neither	Dissatisfied
Manhattan	28.5%	18.0%	53.5%
Outer Borough	24.5	18.0	57.5
Outside N.Y.C.	32.5	27.0	40.5

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit II.C.22

One-Directional Peaking Patterns of Rapid Transit (Trips Crossing Cordon of Manhattan CBD)



Bi-directional peak (morning): 16.7% of 24-hour travel

SOURCE: Pushkarev & Zupan, Public Transportation and Land Use Policy, 1977.

Exhibit II.C.23

Satisfaction with Subway Service

Question IV.A:
How satisfied are you with the time it takes to travel during rush hour by subway?

Destination	Satisfied	Neither	Dissatisfied
Manhattan	39.0%	17.0%	44.0%
Outer Borough	30.0	23.0	47.0
Outside N.Y.C.	31.0	19.0	50.0

Question IV.B:
How satisfied are you with the time you have to wait during rush hours for a subway?

Destination	Satisfied	Neither	Dissatisfied
Manhattan	43.0%	18.0%	40.0%
Outer Borough	42.0	27.0	30.0
Outside N.Y.C.	41.0	26.0	33.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit II.C.24

HOW MUCH TIME IS THERE BETWEEN TRAINS DURING THE RUSH HOUR?
(Base: Respondents who ride a subway to Manhattan destinations)

	TOTAL	NON MAN-HA-TTAN TOTAL	QUEENS	BROOK-LYN	BRONX	MAN-HA-TTAN
TOTAL ANS	572	453	124	227	102	119
1 - 3 MINUTES	4%	5%	6%	2%	8%	3%
4 - 6 MINUTES	32%	32%	40%	25%	38%	30%
7 - 10 MINUTES	35%	34%	23%	42%	30%	37%
11 - 15 MINUTES	14%	15%	9%	19%	13%	10%
16 - 20 MINUTES	5%	6%	6%	6%	5%	3%
21 - 30 MINUTES	1%	1%	2%	1%	-	2%
OVER 30 MINUTES	1%	•	1%	•	-	2%
DON'T USE	2%	1%	3%	1%	-	4%
NOT SURE	6%	6%	9%	4%	6%	8%

HOW MUCH TIME IS THERE BETWEEN TRAINS DURING THE NON-RUSH HOUR PERIOD?
(Base: Respondents who ride a subway to Manhattan destinations)

	TOTAL	NON MAN-HA-TTAN TOTAL	QUEENS	BROOK-LYN	BRONX	MAN-HA-TTAN
TOTAL ANS	570	451	124	226	101	119
1 - 3 MINUTES	•	-	-	-	-	1%
4 - 6 MINUTES	1%	2%	4%	•	2%	-
7 - 10 MINUTES	11%	13%	15%	9%	20%	5%
11 - 15 MINUTES	25%	23%	20%	26%	21%	32%
16 - 20 MINUTES	29%	26%	27%	27%	21%	39%
21 - 30 MINUTES	14%	15%	12%	15%	18%	13%
OVER 30 MINUTES	10%	12%	8%	12%	14%	3%
DON'T USE	3%	3%	6%	2%	2%	2%
NOT SURE	6%	7%	8%	8%	3%	4%

SOURCE: NYSDOT, NYers Evaluate Their Transportation System, April 1978.

Exhibit II.C.25

SOURCE: NYC Transit Authority, "A Study of Attitudes toward the NY Subway," June 1975.

	Queens		Manhattan		Bronx		Brookly	
	Users	Non-Users	Users	Non-Users	Users	Non-Users	Users	Non-Use
	%	%	%	%	%	%	%	%
Easy to use	67	49	80	86	75	64	83	82
Crowded	87	91	76	71	91	92	71	58
Safe from strangers	25	22	58	44	23	18	23	17
Seats always available	32	15	42	46	21	21	32	37
Available 24 hrs. a day	84	58	71	80	74	61	80	72
No traffic delays	87	76	73	73	77	77	77	84
No long vehicle waits	56	50	53	66	63	49	67	60
Employees helpful	49	42	58	59	48	46	58	47
Fastest way to travel	71	55	78	84	67	49	81	74
Always on time	64	48	73	71	62	44	79	75
Come and go when I want	59	46	68	69	64	52	78	70
Frequent service to destination	78	65	77	68	74	72	90	88
Safe while waiting	49	50	51	42	30	23	40	38
Uncomfortable around fellow passengers	50	48	53	53	57	58	47	42
Pleasant surroundings while waiting	29	30	42	35	16	18	20	21
Terrifying conditions walking between subway and destination	46	41	55	62	54	62	45	43
Rowdy people on subway when travel	64	60	48	55	61	62	60	59
Poor lighting while waiting	55	58	51	55	53	55	43	57

Exhibit II.C.26

SOURCE: NYC Transit Authority, "A Study of Attitudes toward the NY Subway," June 1975.

What New Yorkers Do On The Subway

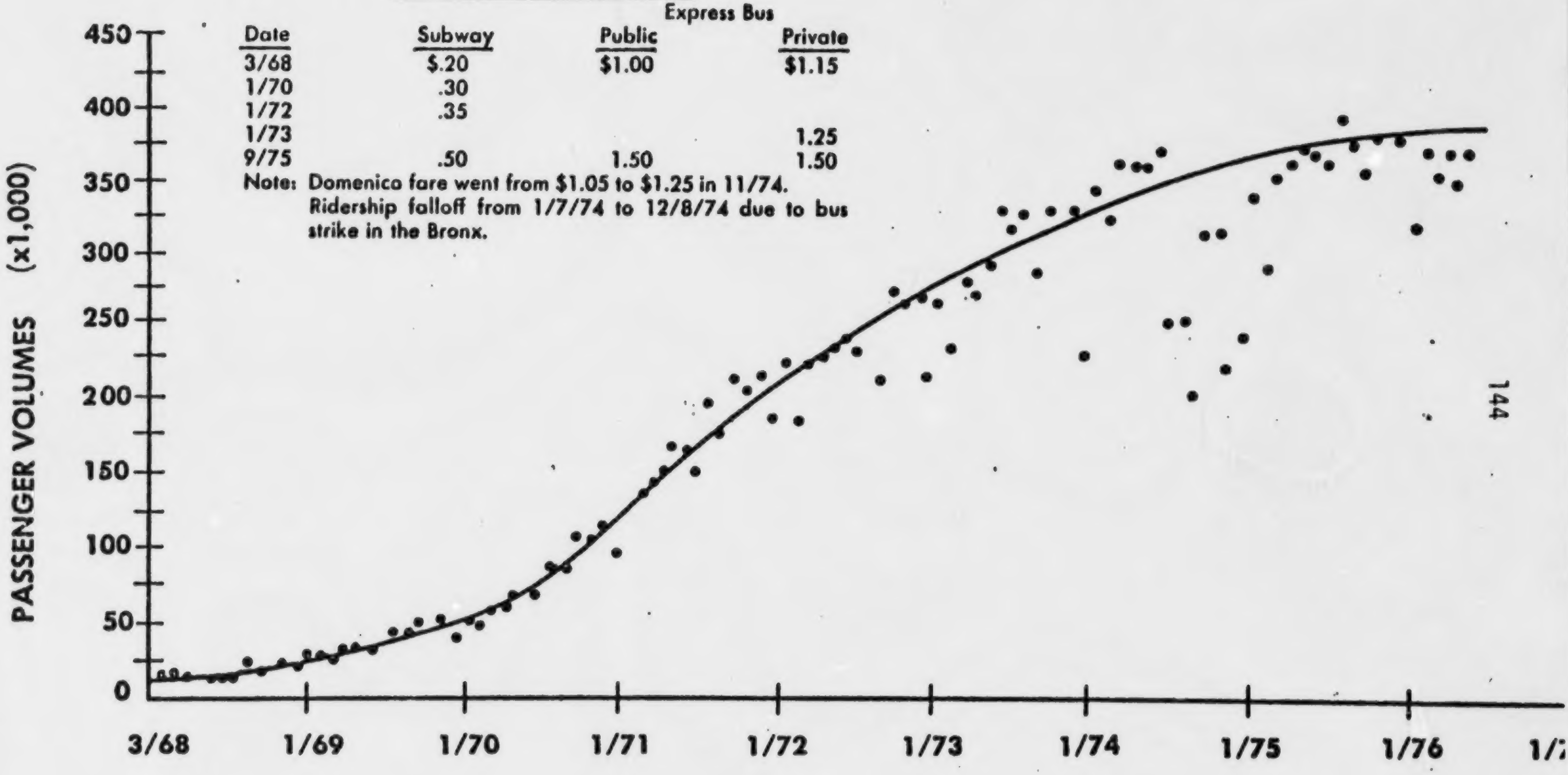
- Most New Yorkers do many things on the subway. Over four out of ten read, over two out of ten watch other people and over one out of ten talk with friends or relatives or simply think.

- Queens residents tend to spend more time thinking (about safety) than other travelers. More Manhattanites do nothing than residents of other boroughs. Nearly seven out of ten Bronx residents read while over half Brooklyn residents read and one out of three watch other people.

Main Ways Time is Passed on the Subway

	Total %	Queens %	Manhattan %	Bronx %	Brooklyn %
Read	45	31	27	69	54
Work	1	1	1	1	1
Sleep	6	5	2	9	9
Talk with friend/relative	16	21	5	10	21
Watch people	24	21	17	17	34
Relax/Rest	7	5	1	2	15
Plan trip/day	5	6	7	4	3
Read ads	10	10	4	11	13
Look around	2	6	-	-	1
Think	15	22	18	16	7
-- About Safety	11	18	16	13	1
-- About life/problems	3	3	1	2	5
-- About business	1	-	1	1	1
Do nothing	8	5	27	4	1
(Number of Respondents)	(781)	(196)	(186)	(197)	(200)

Exhibit II.C.27



SCHEDULE OF FARE CHANGES

Date	Subway	Express Bus Public	Express Bus Private
3/68	$.20	$1.00	$1.15
1/70	.30		
1/72	.35		
1/73			1.25
9/75	.50	1.50	1.50

Note: Domenico fare went from $1.05 to $1.25 in 11/74. Ridership falloff from 1/7/74 to 12/8/74 due to bus strike in the Bronx.

(One week totals plotted at 4 week intervals.)

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Express Bus Passengers Carried per Week

Exhibit II.C.28

Income of NYC Transit Work Riders by Mode*

Income Group	% Auto Driver/Rider	% Subway Rider	% Bus Rider	% Bus and Subway Rider	Walk/ Other
0-2,999	0	0	0	0	0
3,000-5,999	17.1	20.6	0	25.3	22.4
6,000-8,999	1.5	28.0	0	14.6	11.8
9,000-11,999	23.0	11.6	32.1	0	24.0
12,000-14,999	14.4	13.0	26.0	21.7	37.9
15,000-24,999	39.2	24.2	19.7	30.9	0
25,000 +	4.8	2.6	22.2	7.6	3.8

*Columns may not add to 100.0% due to rounding

- The largest group of riders (49%) are made up of persons earning between $3,000 and $9,000 per year. This income group constitutes 45% of the New York City resident working force[1], and transit use among them is very high. For instance, 82% of those earning $6,000-9,000 and 53% of the $3,000-6,000 group use the subway for work every day (Table 3) commuting by subway is the cheapest and most convenient way of getting to and from work for them. Since Manhattan parking fees are high and parking space is extremely limited.

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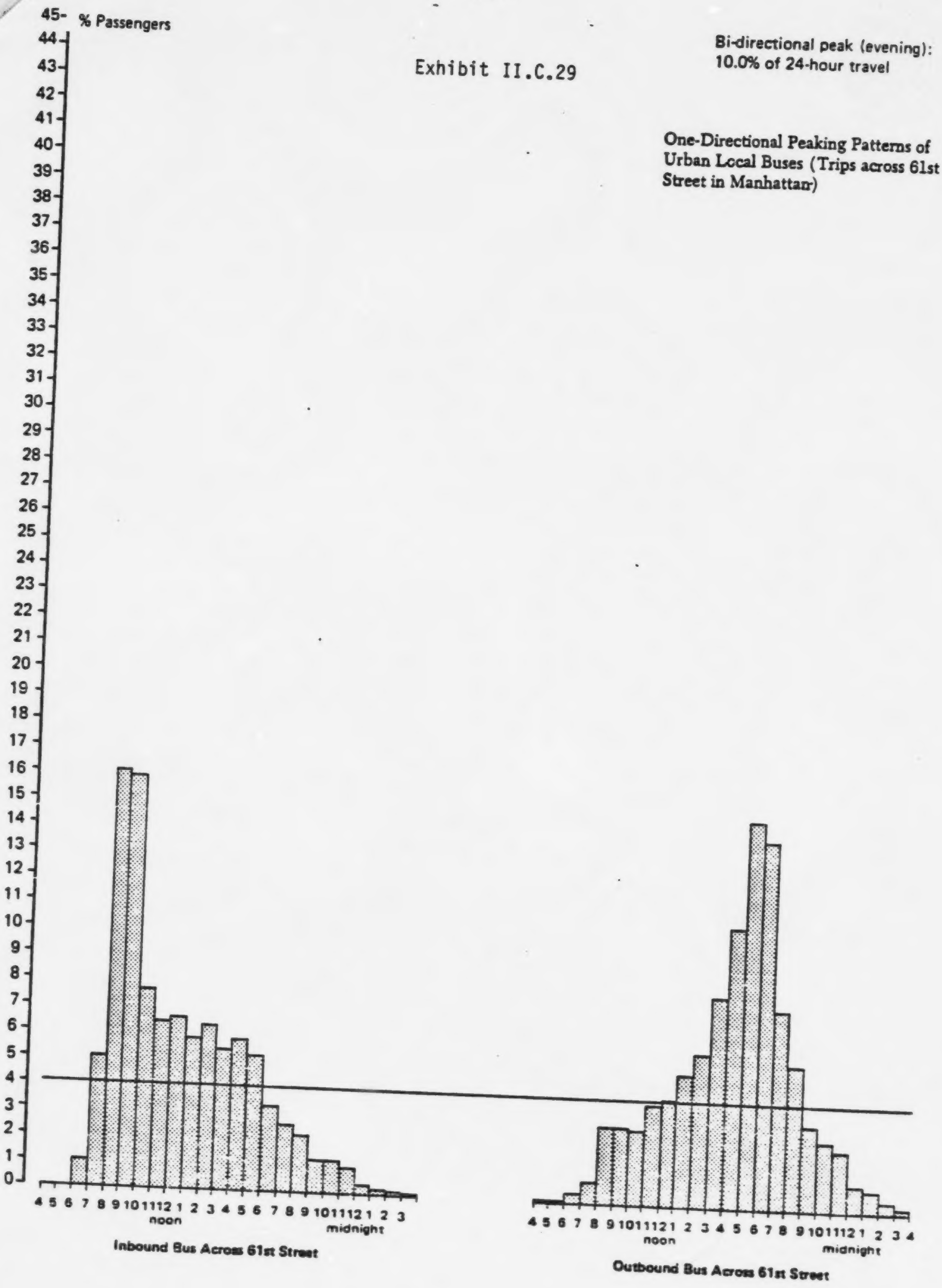
[1] U.S. Census, 1970.

SOURCE: Weiss & Donnelly, "Characteristics of New York State Transit Users," 1976.

Exhibit II.C.29



Bi-directional peak (evening):
10.0% of 24-hour travel

One-Directional Peaking Patterns of Urban Local Buses (Trips across 61st Street in Manhattan)

SOURCE: Pushkarev & Zupan, Public Transportation and Land Use Policy, 1977.

Exhibit II.C.30

HOW MUCH TIME IS THERE BETWEEN BUSES DURING THE RUSH HOUR?
(Base: Ride bus to Manhattan destination)

	TOTAL	NON MAN-HA-TTAN TOTAL	QUEENS	BROOK-LYN	BRONX	MAN-HA-TTAN
TOTAL ANS	163	57	19	14	24	106
1 - 3 MINUTES	1%	2%	-	7%	-	1%
4 - 6 MINUTES	20%	14%	5%	29%	13%	23%
7 - 10 MINUTES	36%	32%	42%	50%	13%	38%
11 - 15 MINUTES	18%	21%	37%	7%	17%	17%
16 - 20 MINUTES	6%	9%	5%	-	17%	4%
21 - 30 MINUTES	3%	7%	-	7%	13%	1%
OVER 30 MINUTES	1%	4%	5%	-	4%	-
DON'T USE	11%	7%	5%	-	13%	13%
NOT SURE	4%	5%	-	-	13%	4%

HOW MUCH TIME IS THERE BETWEEN BUSES DURING THE NON-RUSH HOUR?
(Base: Ride bus to Manhattan destination)

	TOTAL	NON MAN-HA-TTAN TOTAL	QUEENS	BROOK-LYN	BRONX	MAN-HA-TTAN
TOTAL ANS	163	57	19	14	24	106
1 - 3 MINUTES	1%	2%	5%	-	-	-
4 - 6 MINUTES	2%	-	-	-	-	4%
7 - 10 MINUTES	7%	4%	-	-	8%	8%
11 - 15 MINUTES	27%	14%	11%	7%	21%	34%
16 - 20 MINUTES	31%	32%	42%	36%	21%	30%
21 - 30 MINUTES	18%	19%	11%	29%	21%	17%
OVER 30 MINUTES	10%	19%	26%	-	25%	5%
DON'T USE	3%	9%	5%	21%	4%	-
NOT SURE	2%	2%	-	7%	-	2%

SOURCE: NYSDOT, NYers Evaluate Their Transportation System, April 1978.

Exhibit II.C.31

BUS SERVICE PROBLEMS, BY STRATUM, IN PERCENTS

	Total	NYC	Large Metro	Other Urban	Rural
No bus service available	11.9	3.5	2.6	12.4	47.6
Buses don't run often enough	28.4	27.2	34.4	27.6	29.4
Cannot depend on bus schedules	12.8	18.9	13.3	7.6	2.7
There are not enough bus routes	13.4	12.2	12.1	17.8	9.0
It takes too long to go places using the local bus	9.1	10.0	11.7	9.8	2.2
It costs too much	7.1	9.4	8.9	5.5	1.2
The buses are not comfortable	2.8	5.2	.6	1.0	-
A person has too many transfers from one bus to another	4.9	7.9	2.8	2.9	1.1
There is too much crime connected with bus service	1.1	1.6	2.8	-	.4
Other	8.5	4.1	10.8	15.4	6.4

- Only 3.5% of people from New York City feel that no bus service is available, and 13.4% of the Stratum #1 residents feel that there are not enough routes. Although bus-route coverage is fairly comprehensive, most lines are short, feeding rapid-transit stations, and do not provide service to the Manhattan CBD from the outlying boroughs. The feeling might also reflect the dissatisfaction with long walks to the subway which are fairly common for most New Yorkers.

SOURCE: Donnelly et al, "Statewide Public Opinion Survey on Public Transportation," 1975.

APPENDIX C

EXHIBITS FOR

SECTION III.C LOCAL USER PRIORITIES IN EVALUATING PERFORMANCE

Exhibit III.C.1

Satisfaction with Transit Service

Question
How satisfied are you with the hours of available service of:

a. local buses

	Satisfied	Neither	Dissatisfied
Choice	38.0%	24.0%	38.0%
No Choice	28.0	25.0	47.0

b. subways

	Satisfied	Neither	Dissatisfied
Choice	57.0%	20.0%	33.0%
No Choice	43.0	25.0	32.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.2

Satisfaction with Public Transit Service

Question
How satisfied are you with the hours of available service of:

a. subways:

	Satisfied	Neither	Dissatisfied
Auto Driver	39.0%	30.0%	31.0%
Non-Auto Driver	44.0	25.0	1.0

b. local buses:

	Satisfied	Neither	Dissatisfied
Auto Driver	24.0%	28.0%	48.0%
Non-Auto Driver	30.0	27.0	43.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exibit III.C.3

Suitability of Public Transit

Question
Public transportation is suitable for my non-work travel needs.

	Agree	Neither	Disagree
Choice(N=1,095)	56.0%	10.0%	34.0%
No Choice(N=3,208)	48.0	12.0	40.0

Question
Bus and subway services in New York City are doing a good job.

	Agree	Neither	Disagree
Choice	36.0%	12.0%	52.0%
No Choice	22.0	11.0	77.0

Question
In general, public transportation gets me where I want to go.

	Agree	Neither	Disagree
Choice	83.0%	7.0%	10.0%
No Choice	77.0	11.0	12.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.4

Utility of Public Transit

Question
Public transportation is suitable for my non-work travel needs.

	Agree	Neither	Disagree
Auto Driver	30.0%	13.0%	57.0%
Non-Auto Driver	51.0	13.0	36.0

Question
In general, public transportation gets me where I want to go.

	Agree	Neither	Disagree
Auto Driver	47.0%	22.0%	31.0%
Non-Auto Driver	53.0	11.0	36.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, 1977.

Exhibit III.C.5

Utility of Public Transit

Question
In general, public transportation gets me where I want to go.

Origin: Outer Boroughs

Destination	Agree	Neither	Disagree
Manhattan	71.2%	13.8%	15.0%
Outer Borough*	59.8	16.1	24.1
Outside N.Y.C.	45.4	23.9	30.7

Origin: Manhattan

Destination	Agree	Neither	Disagree
Manhattan	81.2%	8.6%	10.2%
Outer Borough	78.6	7.6	13.8
Outside N.Y.C.	68.7	10.1	21.2

Sample size: Manhattan, N = 3,671
Outer Borough, N = 1,851
Outside N.Y.C., N = 405

*Intraborough and interborough respondents were grouped under the outer borough category.

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.6

Satisfaction with Public Transit

Question
How satisfied are you with the time you have to wait during rush hour for:

a. subway:

	Satisfied	Neither	Dissatisfied
Males	47.0%	23.0%	30.0%
Females	40.0	27.0	33.0

b. bus:

	Satisfied	Neither	Dissatisfied
Males	42.0%	27.0%	31.0%
Females	35.0	29.0	36.0

Question
How satisfied are you with the cost of travelling by:

a. subway and local buses:

	Satisfied	Neither	Dissatisfied
Males	19.0%	23.0%	58.0%
Females	14.0	22.0	64.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.7

Satisfaction with Modal Punctuality

Question
How satisfied are you with the opportunity of arriving at your destination on time at rush hours when travelling by:

a. car

	Satisfied	Neither	Dissatisfied
Choice	23.0%	25.0%	52.0%
No Choice	23.0	39.0	38.0

b. subway

	Satisfied	Neither	Dissatisfied
Choice	49.0%	22.0%	29.0%
No Choice	40.0	23.0	37.0

c. bus

	Satisfied	Neither	Dissatisfied
Choice	33.0%	30.0%	37.0%
No Choice	27.0	29.0	44.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.8

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Satisfaction with Modal Punctuality

Question
The opportunity of arriving at your destination on time during rush hours when travelling by car:

Destination	Satisfied	Neither	Dissatisfied
Manhattan	44.0%	9.0%	47.0%
Outer Borough	47.0	9.0	44.0
Outside N.Y.C.	45.0	8.0	47.0

by subway:

	Satisfied	Neither	Dissatisfied
Manhattan	40.0%	14.0%	46.0%
Outer Borough	34.0	19.0	47.0
Outside N.Y.C.	35.0	25.0	40.0

by bus:

	Satisfied	Neither	Dissatisfied
Manhattan	24.0%	22.0%	54.0%
Outer Borough	26.0	21.0	53.0
Outside N.Y.C.	29.0	29.0	42.0

Exhibit III.C.9

Satisfaction with Travel Time

Question
How satisfied are you with the time it takes to travel during rush hours by:

a. car

	Satisfied	Neither	Dissatisfied
Choice	13.0%	31.0%	66.0%
No Choice	38.0	36.0	36.0

b. subway

	Satisfied	Neither	Dissatisfied
Choice	50.0%	19.0%	31.0%
No Choice	36.0	18.0	46.0

c. bus

	Satisfied	Neither	Dissatisfied
Choice	27.0%	35.0%	38.0%
No Choice	27.0	22.0	51.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.10

Satisfaction with Modal Performance

Question
How satisfied are you with the time it takes to travel during rush hour?

a. by car:

	Satisfied	Neither	Dissatisfied
Auto Driver	27.0%	12.0%	61.0%
Non-Auto Driver	14.0	35.0	51.0

b. by subway:

	Satisfied	Neither	Dissatisfied
Auto Driver	27.0%	24.0%	49.0%
Non-Auto Driver	39.0	22.0	40.0

c. by bus:

	Satisfied	Neither	Dissatisfied
Auto Driver	19.0%	28.0%	53.0%
Non-Auto Driver	27.0	28.0	45.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.11

Question
I do not feel comfortable with the kinds of people riding local buses.

Destination	Agree	Neither	Disagree
Manhattan	23.0%	31.0%	44.0%
Outer Borough	27.0	30.0	43.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.12

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Attitudes Toward Public Transit

Question
I would think twice about using public transportation when going somewhere I have never been before.

	Agree	Neither	Disagree
Males	53.0%	18.0%	29.0%
Females	57.0	16.0	27.0

Question
I do not feel comfortable with the kind of people riding the subways.

	Agree	Neither	Disagree
Male	56.0%	20.0%	24.0%
Females	61.0	19.0	20.0

Exhibit III.C.13

Satisfaction with Transportation Costs

Question
How satisfied are you with the cost of travelling?

	Satisfied	Neither	Dissatisfied
Manhattan	21.0%	9.5%	69.5%
Outer Borough	25.0	11.0	64.0
Outside N.Y.C.	26.0	6.5	67.5

by subway or buses:

	Satisfied	Neither	Dissatisfied
Manhattan	14.0%	18.5%	67.5%
Outer Borough	18.5	18.5	63.0
Outside N.Y.C.	20.0	18.0	62.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.14

Satisfaction with Transportation Costs

Question
How satisfied are you with the cost of travelling?

a. by car:

	Satisfied	Neither	Dissatisfied
Auto Driver	23.0%	16.0%	61.0%
Non-Auto Driver	16.0	37.0	47.0

b. by subways or buses:

	Satisfied	Neither	Dissatisfied
Auto Driver	16.0%	27.0%	57.0%
Non-Auto Driver	14.0	22.0	64.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.15

c. What Improvements Users Would Like To See

The percentages of responses to the various categories were (DOT):

More rush hour buses	54%
Guaranteed seat	45%
Added hours of operation during weekdays	42%
Added hours of operations during weekends	34%
Bus shelters	30%
Remainder of 6 categories	60%

Note: Multiple responses were possible.

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III,C.16

Importance of Travel Attributes

Question
Which would you consider most important to your travel needs?

F. Modern vehicles

Destination	Yes	No
Manhattan	13.0%	87.0%
Outer Borough	9.5	90.5
Outside N.Y.C.	7.0	93.0

I. Cost

Destination	Yes	No
Manhattan	45.5%	54.5%
Outer Borough	40.0	60.0
Outside N.Y.C.	45.0	55.0

J. Comfort

Destination	Yes	No
Manhattan	31.0%	79.0%
Outer Borough	24.5	75.5
Outside N.Y.C.	26.0	74.0

M. Travel on an air-conditioned vehicle

Destination	Yes	No
Manhattan	74.0%	26.0%
Outer Borough	64.0	36.0
Outside N.Y.C	64.0	36.0

N. Be informed of causes for delay while travelling.

Destination	Yes	No
Manhattan	65.0%	35.0%
Outer Borough	51.0	49.0
Outside N.Y.C.	56.0	44.0

O. Access to information about routes and directions.

Destination	Yes	No
Manhattan	34.5%	65.5%
Outer Borough	48.0	52.0
Outside N.Y.C.	42.0	58.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.17

Importance of Travel Attributes

Attribute	Males Rank	Males (%)	Females Rank	Females (%)
1. Clean vehicles	2	(53.1%)	2	(56.6%)*
2. Avoid annoyance by other passengers	9	(23.2%)	8	(26.1%)
3. Safety from vehicle accidents	5	(34.4%)	4	(47.2%)*
4. Travel information availability	12	(7.5%)	11	(9.1%)
5. Safety from harm by others	1	(60.0%)	1	(68.9%)*
6. Modern vehicles	10	(14.4%)	10	(10.9%)
7. Arriving on time	3	(51.2%)	3	(51.3%)
8. Riding enjoyment	11	(10.5%)	12	(5.6%)
9. Cost	4	(44.6%)	5	(42.8%)
10. Comfort	8	(29.4%)	9	(23.2%)
11. Convenience	7	(34.6%)	6	(31.6%)
12. Travel time	5	(34.4%)	7	(26.4%)

*Chi-square analysis indicated that females put more emphasis on the starred items.

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit III.C.18

SOURCE: Donnelly et al, "Statewide Public Opinion Survey on Public Transportation," 197

Regular Bus Service

The greatest need for regular bus service appears in the less-populated sections of the State; the lower the population density, the more strongly the need is expressed

TABLE 15
PERCENT PUBLIC TRANSIT PREFERENCE BY STRATUM

	Total	NYC	Large Metro	Other Urban	Rural
Regular bus service	49.1	31.1	61.1	64.1	67.5
Door-to-door transit	13.8	20.2	10.1	9.6	4.1
Rail rapid transit	17.7	30.0	7.9	8.1	5.1
Inter-city train service	10.0	5.5	12.4	14.2	13.9
Don't know	9.5	13.3	8.4	4.1	9.4

APPENDIX D

EXHIBITS FOR

SECTION IV.B.3 EVALUATION OF THE APPROPRIATENESS OF THE ACTIONS

Exhibit IV.8.3.1

RPA, "The Metropolis Speaks," August 1974.

CHOICE **Subsidizing Transit**

Question and answers. How should fares on public transportation be subsidized, if at all?

Enough to keep up with the cost of living:	33%
Enough to reduce them:	34%
Enough to have free transit:	16%
Not at all:	14%
No vote:	3%

Gallup survey. To what extent, if at all, do you think the government should help in paying for fares people pay for public transportation—should the government cover the total fare, part of the fare, or do you think it should cover none of these fares?

Total:	12%
Part:	42%
None:	38%
Don't know:	7%

Comparable CHOICES vote:

Total:	16%
Part:	67%
None:	14%
Don't know:	3%

Background information. In recent years, a decline in transit ridership has always followed a rise in fares—so that to maintain existing ridership, it seems necessary to keep fares from rising as fast as they have been, i.e., more than three times faster than the cost of living. That rise is due to the fact that productivity can only increase a limited amount—at least two men are needed on subways, one man on buses. So no relief is in sight—as productivity rises in goods production, the relative cost of services like transit cannot help but rise. And, if the past is indicative, that means a steady decline in passengers and more autos on the roads. We might prefer a government subsidy to slow the fare rise and ridership decline.

Against subsidies is the argument that when the price of some good is lower than its cost, people are encouraged to use it more than it is really worth to them. Also, transit subsidies are an inefficient way to help the poor since the average transit rider even in New York City has a $10,000 income and the commuter railroad rider even higher.

Voter differences. All categories had substantial majorities for transit subsidies. Even those living in exurbia favored subsidies 78-18.

Education-income: Support for subsidies rose slightly with education (77% of adults without high school diplomas to 87% with graduate degrees). Abstracting education, those with incomes below $13,000 were most favorable, those with incomes between $13,000 and $35,000 least favorable.

Participation: Those who only voted favored subsidies 76-18; those who watched, read and discussed 92-6.

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Exhibit IV.B.3.2

RPA, "The Metropolis Speaks," August 1974.

CHOICE More Public Transportation?

Question and answers. Should public policy in the New York-New Jersey-Connecticut Region encourage more reliance on public transportation?

- Favor: 89% Oppose: 6% No opinion: 5%

Background information. The automobile has allowed us to spread out recent development; it is more convenient and faster than other forms of travel in the Region, except to large downtowns during rush hour. However, its air polluting characteristics have not been solved; it uses large amounts of energy and induces people to travel more than they otherwise would. It uses a great amount of space, making easy interchange more difficult throughout the day. Our reliance on the auto limits opportunities for those who cannot drive, and it is the most dangerous mode of travel. More reliance on the public transportation would require more compact organization of the Region, both neighborhoods and work places.

Voter differences. All voter categories provided large majorities.

Education-income: Support increased a small amount with higher income and more education.

Participation: Those who only voted favored the i[illegible]n 81-8; those who watched, read and discussed voted 93-4. Discussion slightly decreased support.

Exhibit IV.B.3.3

HOW LIKELY IS IT THAT YOU WOULD NOT GO BY CAR INTO MANHATTAN IF THE CRITICISMS OF THE BUS AND SUBWAY SYSTEM WERE TAKEN CARE OF BY PUBLIC AUTHORITIES?

(Base: Travel by automobile to Manhattan destination)

	TOTAL
TOTAL ANS	122
DEFINITELY WOULD NOT GO BY CAR	4%
PROBABLY WOULD NOT GO BY CAR	9%
MIGHT OR MIGHT NOT GO BY CAR	18%
PROBABLY WOULD GO BY CAR	25%
DEFINITELY WOULD GO BY CAR	34%
NOT SURE	9%

SOURCE: NYSDOT, NYers Evaluate Their Transportation System, April 1978.

Exhibit IV.B.3.4

IF THE FARES ON THE BUS AND SUBWAY SYSTEM WERE CUT IN HALF,
HOW LIKELY IS IT THAT YOU WOULD NOT GO BY CAR INTO MANHATTAN
(Base: Travel by automobile to Manhattan destination)

	TOTAL
TOTAL ANS	94
DEFINITELY WOULD NOT GO BY CAR	2%
PROBABLY WOULD NOT GO BY CAR	5%
MIGHT OR MIGHT NOT GO BY CAR	22%
PROBABLY WOULD GO BY CAR	38%
DEFINITELY WOULD GO BY CAR	30%
NOT SURE	2%

SOURCE: NYSDOT, NYers Evaluate Their Transportation System, April 1978.

Exhibit IV.B.3.5

Relation of Lower Transit Fare to Ridership

Question
I would make more use of the buses and subways if the fare went down.

	Agree	Neither	Disagree
Auto Driver	33.0%	35.0%	32.0%
Non-Auto Driver	52.0	29.0	19.0

SOURCE: NYCDOT, Better Integration of Transportation Modes, Sept. 1977.

Exhibit IV.B.3.6

- WOULD YOU BE MORE LIKELY TO USE BUSES AND SUBWAYS IF FARES WERE REDUCED TO $.25?

SOURCE: NYSDOT, NYers Evaluate Their Transportation System (Harris Survey), April 1978.

							INCOME				MEANS OF TRAVEL		
	TOTAL	NON MAN-HA-TTAN TOTAL	QUEENS	BROOK-LYN	BRONX	MAN-HA-TTAN	UNDR $7M	$7M-$14,999	$15M-$24,999	$25M & OVER	AUTO	Van CAR POOL	MASS TRAN-SIT
TOTAL ANS	923	722	257	303	162	201	177	349	244	86	150	8	699
MORE LIKELY	27%	26%	26%	17%	43%	30%	32%	28%	27%	15%	19%	36%	28%
NOT MUCH DIFFERENCE	65%	69%	71%	74%	56%	53%	55%	64%	68%	79%	75%	63%	64%
NOT SURE	8%	5%	4%	9%	1%	17%	13%	8%	5%	6%	6%	-	9%

Exhibit IV.B.3.7

WOULD YOU FAVOR A PROPOSAL WHERE THE PRESENT $.50 FARE WOULD BE REDUCED TO $.25 AND, AT THE SAME TIME, HAVE PEOPLE PAY AN ADDITIONAL AMOUNT OF TAX?

SOURCE: NYSDOT, NYers Evaluate Their Transportation System (Harris Survey), April 1978.

							INCOME				MEANS OF TRAVEL		
	TOTAL	NON MANHATTAN TOTAL	QUEENS	BROOK-LYN	BRONX	MANHATTAN	UNDR $7M	$7M-$14,999	$15M-$24,999	$25M & OVER	AUTO	Van CAR POOL	MASS TRANSIT
TOTAL ANS	923	722	257	303	162	201	177	349	244	86	150	8	699
FAVOR	32%	26%	29%	25%	25%	53%	42%	36%	27%	22%	22%	-	34%
OPPOSE	56%	62%	57%	65%	63%	37%	40%	54%	64%	69%	72%	63%	54%
NOT SURE	11%	12%	14%	10%	12%	10%	18%	11%	9%	9%	6%	38%	12%

Exhibit IV.B.3.8

DISAPPROVE OF MASS TRANSPORTATION SERVICE CUTS
(Base: Disapprove of service cuts)

	Disapprove %	Still Disapprove If Fares Must Be Raised %
1. Less frequent bus and subway service during rush hour	87	74
2. Less frequent bus and subway service during non-rush hour periods	63	50
3. Shortening subway trains during off peak hours	37	29
4. Closing some subway stations late at night	56	46
5. Elimination of all subway service late at night	78	65
6. Elimination of add-a-ride fares	59	43
7. Elimination of duplicate service that is bus/subway lines which run next to each other	41	31

SOURCE: NYSDOT, NYers Evaluate Their Transportation System (Harris Survey), April 1978.

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